

# FT-112

Weighing Terminal

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User Manual



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# 1 SAFETY INSTRUCTIONS



**CAUTION:** READ this manual BEFORE operating or servicing this equipment. FOLLOW these instructions carefully. SAVE this manual for future reference. DO NOT allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment. ALWAYS DISCONNECT this equipment from the power source before cleaning or performing maintenance.

CALL Flintec for parts, information, and service.



**WARNING:** Only permit qualified personnel to service this equipment. Exercise care when making checks, tests and adjustments that must be made with power on. Failing to observe these precautions can result in bodily harm.



**WARNING:** For continued protection against shock hazard connect to properly grounded outlet only. Do not remove the ground prong.



**WARNING:** Disconnect all power to this unit before removing the fuse or servicing.



**WARNING:** Before connecting/disconnecting any internal electronic components or interconnecting wiring between electronic equipment always remove power and wait at least thirty (30) seconds before any connections or disconnections are made. Failure to observe these precautions could result in damage to or destruction of the equipment or bodily harm.



**CAUTION:** Observe precautions for handling electrostatic sensitive devices.

## 2 INTRODUCTION

### 2.1 Overview

FT-112 weighing terminal is an economic and powerful state-of-the-art indicator for industrial weighing applications like basic weighing, checkweighing, classifying, labeling, filling, and totalization etc. FT-112 has a total capacity of 1000 records identification, 500 each for specific tare memories, 500 each for set memories for weighing and piece counting, 500 items for average piece weight memory.

The scales equipped with FT-112 weighing terminal can be used in all kinds of industrial areas including wet and hygienic environments with their fast and efficient cleaning built according to international guidelines.

### 2.2 Specifications

Analogue Load Cell (FT-112)	
A/D converter type	24-bit Delta-Sigma ratio metric with integral analog and digital filters
Conversion rate	Up to 800 measurement values per second
Input sensitivity	0.4 $\mu\text{V}/\text{e}$ approved; 0.05 $\mu\text{V}/\text{e}$ non-approved.
Analog input range	-5 mV ... +19 mV
Internal resolution	up to 16 000 000
Excitation	5 VDC max. 125mA
Number of load cells	Up to 8 load cells 350 $\Omega$ or 25 load cells 1200 $\Omega$ .
Connection	4- or 6-wire technique. Cable length: maximum 1000 m/mm <sup>2</sup> for 6-wire connection
Digital Load Cell (FT-112D)	
Interface port	RS485
Interface baud rate	Up to 57600
Connection	4-wire. Up to 500 meters
Number of load cell	Up to 16 digital load cells. (Contact with the factory for max. 30 load cells)
Internal resolution	200 000 counts
Excitation	External 12 VDC, 1.3 A over LPK24 (lightning protection box)
Lightning protection	In the Lightning Protection Kit additional to internal protection.
Scale	
Platform	<b>FT-112</b> up to 2 platforms with analogue load cell. Two Scale Displays and summing scale by pressing the scale select key. Summing scale can be used for serial or parallel platform operations.  <b>FT-112D</b> can be connected to a scale equipped with digital load cell(s) RC3D. A Second scale connection is not available.
Display resolution	Programmable to single range, 2x or 3x multi range, 2x or 3x multi-interval Single range is limited to 10 000 divisions, multi range and multi-interval according to EN45501 and OIML R67 for trade use. For industrial use the scale is limited to 999 999 increments.

Calibration and Functions		
Calibration	Calibration with test weights, Electronic calibration without test weights Temporary zero calibration Zero adjustment, Gain adjustment Entry of Coefficients	
Digital filter	5 step programmable adaptive filter	
Dynamic filter	Programmable dynamic filter	
Weighing functions	Taring, zeroing, auto zero tracking, motion detection, auto zero at power up, tare status is saved at power off, increased resolution, automatic tare and tare clear, temporary gross indication, unit change (only FT-112).	
Standard applications	Labeling, piece counting, checkweighing, classifying, filling, packing, free setpoints, functional outputs, totalization, livestock weighing, Remote IO or PLC or HMI	
Memory		
Application memories	ID1, ID2, Limit values for weighing, Limit values for piece counting, average piece weight of Item memory, preset tare memory. Each memory size has capacity for 500 records.	
Alibi memory (optional)	99 999 records	
Communication		
Connectable with	PC, PLC, Printer, Remote display, Bar code reader, Card reader, RFID, EPL printer etc.	
RS 232	Port	2 ports opto-isolated, 3 wires
	Baud rate	1200 to 57600 programmable
	Data	7- or 8-bit Length; parity even, odd or even
RS 485	Baud rate	1200 to 57600 programmable
	Data	7- or 8-bit Length; parity even, odd or even
	Stations	Up to 31 stations
Ethernet TCP/IP	Transmission rate	10 / 100 Mbit/s, Full duplex
	TCP/IP settings	Manual IP assign over EtherX PC Software or by keys in programming mode.
	Connection method	Server or Client
	Installation	Switched Ethernet transmission with shielded twisted pair cables RJ-45.
	Isolation	Galvanically isolated bus electronics
Response speed	Up to 4 ms response delay after read/write commands	
USB	Connection	Standard USB Mini-B cable
	Response speed	Min. 4 ms response delay after read/write commands
Digital Inputs and Outputs (optional)		
Digital Inputs	Opto-isolated 4 digital inputs, 12 to 28 VDC, 10mA	
Digital Outputs	5 free relay contacts, 250 VAC or 30 VDC, 0.2A	

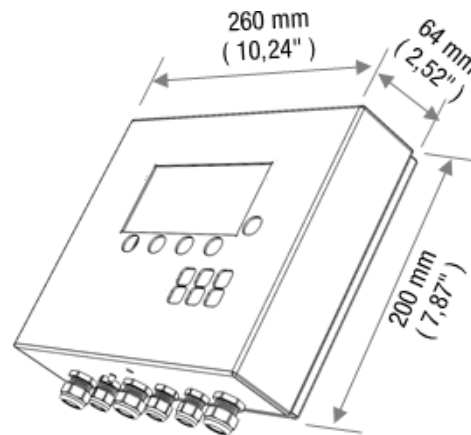
Analogue Output (optional)	
Voltage output	0-5 VDC, 0-10 VDC
Current output	4-20mA, 0-20mA
Resolution	60 000 steps
Max. cable length	300 meters
Max. load resistance (current output)	500 $\Omega$
Min. load resistance (voltage output)	10 k $\Omega$
Profibus DPV1 (optional)	
Data rate	Up to 12000 kbit/s with automatic baud rate detection
GSD file	Generic GSD-file provided
Topology	Depending on physical media RS-485: segmented line topology without stubs
Installations	Shielded twisted pair cable Line length depending on physical media and transmission speed
Max. Stations	up to 126 stations per network
Isolation	Galvanically isolated bus electronics
Response speed	Min. 4 ms response delay after read/write commands
Profinet (optional)	
Data rate	100 Mbit/s, full duplex
GSDML file	Generic GSDML-file provided
TCP/IP settings	DHCP or manual IP are assigned over EtherX PC Software or by keys in programming mode. Device identity customization
Topology	Line, Bus, Star or Tree topology depending on physical media
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.
Web client	Available
Isolation	Galvanically isolated bus electronics
Response speed	Min. 4 ms response delay after read/write commands
CANopen (optional)	
Data rate	10 kbit/s – 1 Mbit/s (selectable) kbit/s
EDS file	Generic EDS-file provided
Topology	Line with Trunkline, Dropline structure and Termination at both Ends Line length depending on baud rate 25 – 500 meters.
Installation	2 wire shielded twisted pair cable Alternatively, 4 wires with 24 Volt power supply over the bus
Max. Stations	Up to 127 stations per network
Isolation	Galvanically isolated bus electronics
Response speed	Min. 4 ms response delay after read/write commands



EtherNet/IP (optional)	
Data rate	10 Mbit/s or 100 Mbit/s, full duplex
EDS file	Generic EDS-file provided
DLR (Device Level Ring)	Available
TCP/IP settings	DHCP or manual IP assign over EtherX PC Software or by keys in programming mode. Device identity customization
Topology	Line, Bus, Star or Tree topology depending on physical media
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.
Web client	Available
Isolation	Galvanically isolated bus electronics
Response speed	Up to 4 ms. response delay after read/write commands.
EtherCAT (optional)	
Data rate	100 Mbit/s, full duplex
ESI file	Generic ESI-file provided
Topology	Line, Tree, Star or Daisy-chain topology depending on physical media
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.
Isolation	Galvanically isolated bus electronics
Response speed	Up to 4 ms. response delay after read/write commands.
CC-Link (optional)	
Data rate	156 kbit/s – 10 Mbit/s (selectable)
Topology	Line with Trunkline, Branch structure and Termination at both Ends.
Installation	3 wires shielded twisted pair cable.
Max. Stations	Up to 64 stations per network
Isolation	Galvanically isolated bus electronics
Response speed	Up to 4 ms. response delay after read/write commands
Powerlink (optional)	
Compatibility	Supports Ethernet POWERLINK V2.0 Communication Profile Specification version 1.2.0
Data rate	100 Mbit/s, half duplex
XDD file	XDD-file provided
Ring redundancy	Available
Topology	100% free choice of star, tree, ring or daisy chain
Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45 connectors.
Isolation	Galvanically isolated bus electronics
Response speed	Min. 4 ms response delay after read/write commands

Power Consumption	
	100 – 240 VAC max. 75 mA or 12 – 28 VDC max. 750 mA (FT-112)
Environment and Enclosure:	
Operation temp. range	Approved scales -10 °C to +40 °C Industrial usage -15 °C to +50 °C
Humidity	85% RH max, non-condensing
Enclosure	Stainless steel
Protection	IP67
Sizes (W x H x D)	260 x 200 x 64 mm (10,24 x 7,87 x 2,52" )
Weight	
Net	2,3 kg
Gross	3,2 kg
Packing sizes	290x280x210 mm

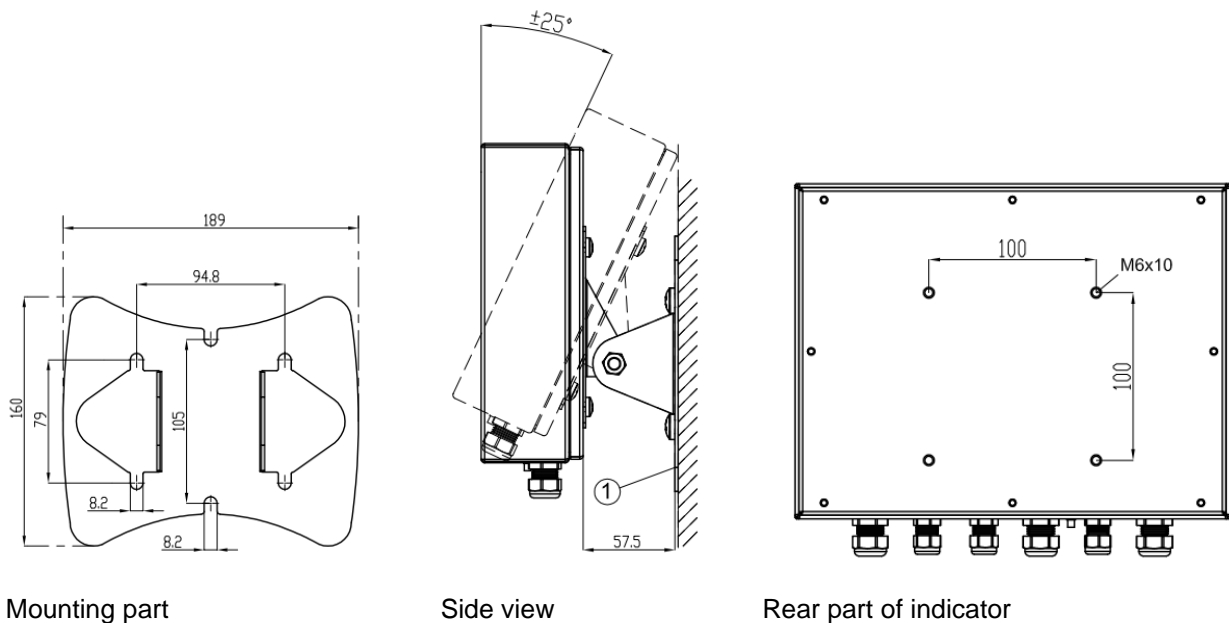
## 2.3 Housing



## 2.4 Mounting kits

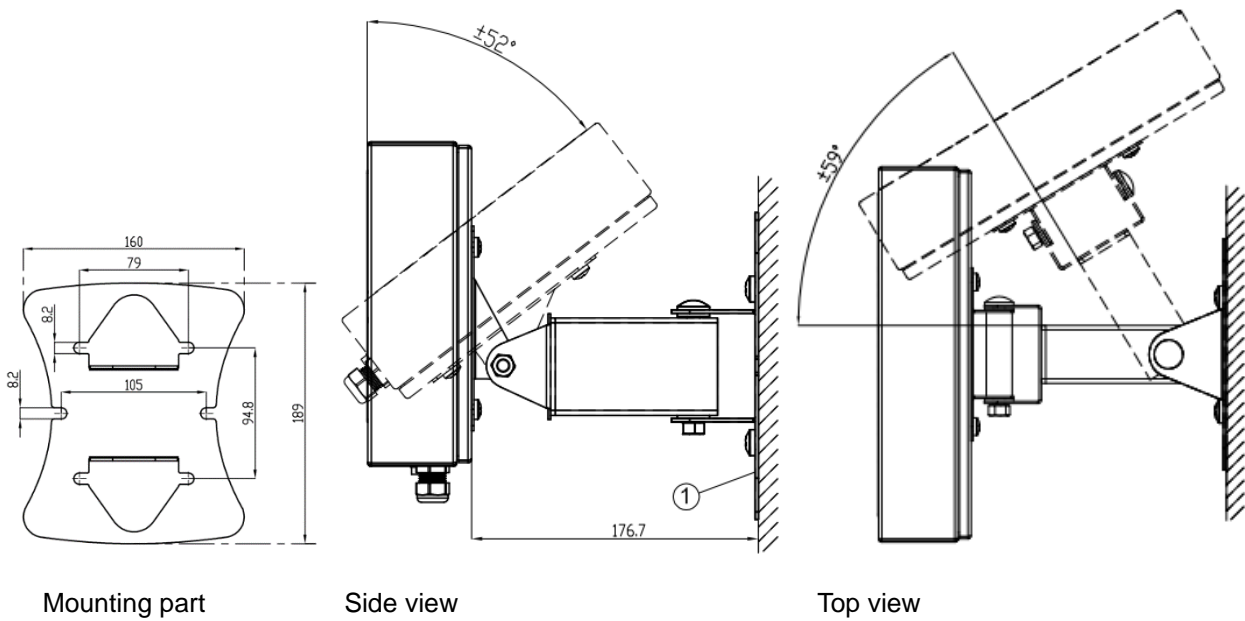
### Wall mounting kit

This kit can be used to install the weighing terminal on to the desk or to the wall. Its mounting dimensions and adjustment angles are shown below.



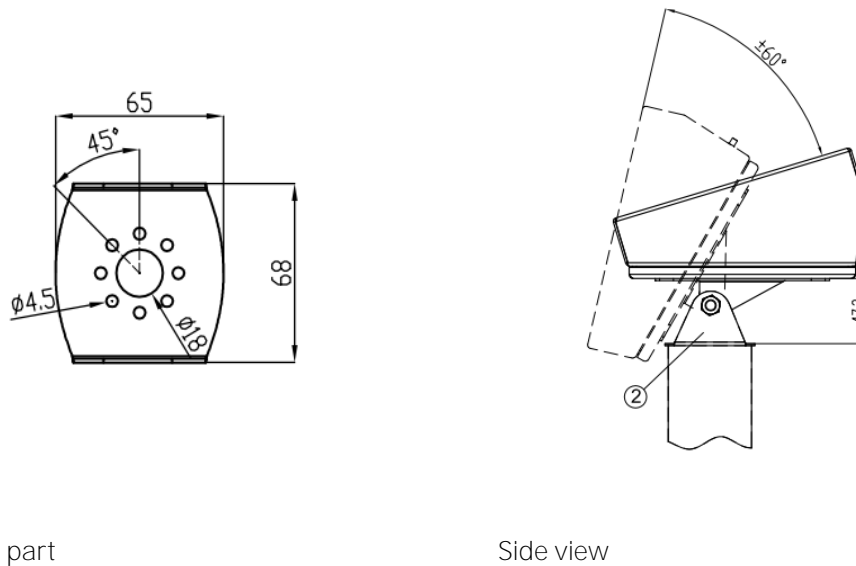
## 2D Wall mounting kit

This kit can be used to install the weighing terminal on to the wall. 2D wall mounting kit provides to adjust the angles of the terminal at two directions. Its mounting dimensions and adjustment angles are shown below.



## Column mounting kit

This kit can be used to install the weighing terminal on to the column of the platform. Its mounting dimensions and adjustment angles are shown below.



### 3 THE FRONT VIEW AND KEY FUNCTIONS

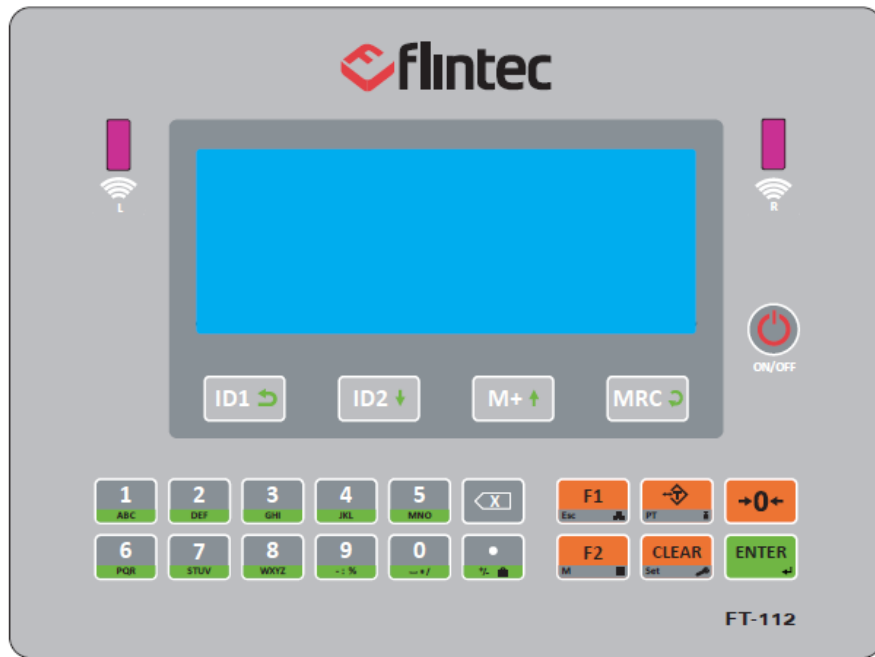
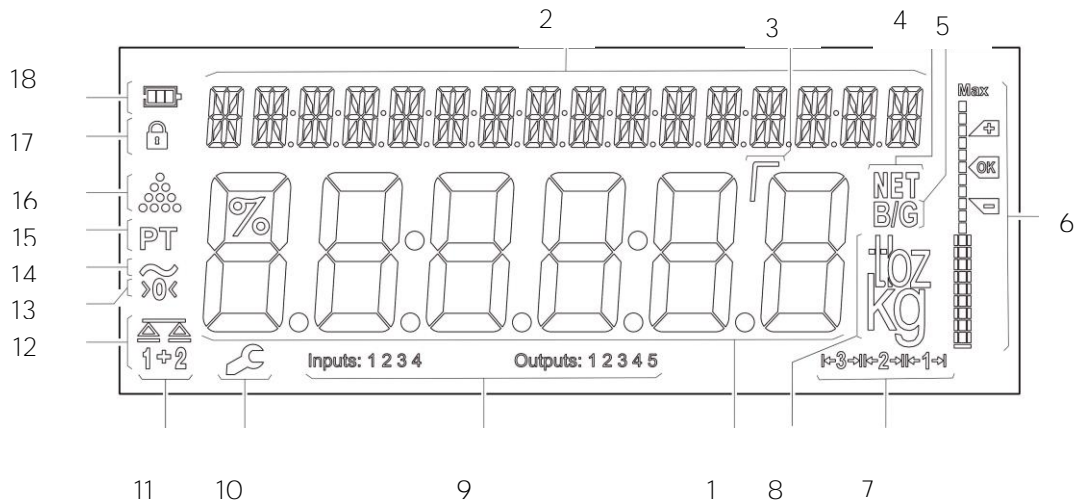





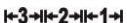



Figure 3.1 – Front view of FT-112

#### 3.1 Display

The bright and wide-angle LCD display of the FT-112 is shown below.



Key to the symbols displayed on the display are:

1		6-digit 22 mm height big weighing display with sign
2		16-digit 8 mm height alphanumeric information display
3		High resolution digit separator.
4	<b>NET</b>	Displays that the indicated value is the net weight.
5	<b>B/G</b>	Displays that the indicated value is the gross weight.
6		Bar graph
7		Indicates the scale range of the scale utilized as a multi-range or as a multi-interval operation.
8	<b>kg</b>	g, oz, kg, t, lb units are located on the right of the display.
9	<b>Inputs: Outputs:</b>	Displays the activated inputs and outputs.
10		Displays that the instrument requires repair or Call service.
11		Indicates the number of which scale is in operation.
12		Summing scale. Announces the weight value on the display is the sum of two scales.
13	<b>&gt;0&lt;</b>	Displays that the weight value is in the center of zero range.
14		Displays unstable weighing result. After stabilization of the weighing, this symbol disappears.
15	<b>PT</b>	Displays that the scale is being used with preset tare after entering the specified tare value.
16		Announces the weighing indicator is in piece counting mode.
17		Indicates that keylock is enabled.
18		Indicates the battery charge level

## 3.2 Key Pad

The keys and the key functions of FT-112 in usage are:

	<p><b>On.</b> Press the key to switch on the weighing terminal.</p> <p><b>Off.</b> Press the key for more than 2 seconds to switch off the instrument.</p>	
	<p><b>Identification data.</b> ID 1 and ID 2 keys are used to enter identification data. ID2 key can be programmed for another function.</p>	Page 78, 55
	<p><b>Totalization.</b> This key is used for totalization of all weighings.</p>	Page 31
	<p><b>Total.</b> This key is used to indicate the totalization value.</p> <p><b>Grand Total.</b> Press this key for more than 2 seconds to display Grand Total.</p> <p><b>Clear total.</b> Press this key to clear the total or grand total which is displayed.</p>	Page 31, 58
	<p><b>Navigation keys.</b> ID1, ID2, M+ and MRC keys also have navigation functions in the memories and in the programming etc.</p> <p>The meanings of the symbols on keys at usage are;</p> <ul style="list-style-type: none"> <li> Return.</li> <li> Decrease or return to the previous step.</li> <li> Increase or proceed to the next step.</li> <li> Change the item or enter a parameter.</li> </ul>	Page 38
	<p><b>IR keys.</b> These touch-free infrared keys are programmable for easy use of the instrument.</p>	Page 33
	<p><b>Programmable Function key "F1".</b> This programmable key is set for easy use in an application.</p> <p><b>Esc.</b> The second function of this key is escape. Press the key to escape from any entry or step in operation.</p>	Page 55
	<p><b>Programmable Function key "F2".</b> This programmable key is set for easy use in an application.</p> <p><b>Memory.</b> The second function of the key selects memory transactions. Press this key for more than 2 seconds to enter memories. Or press this key to load any item from memory in any entry step like ID, PT etc.</p>	Page 30, 78, 80, 55
	<p><b>Tare.</b> Press this key to tare the scale.</p> <p><b>PT.</b> Enter the specific tare value by pressing this key for more than 2 seconds.</p>	Page 29, 30, 54
	<p><b>Zeroing.</b> If the unloaded scale does not indicate zero when scale is in gross mode, press this key to compensate for zero drift.</p>	Page 28, 64
	<p><b>Clear.</b> Clears the tare and indication returns to the gross value.</p> <p><b>SET value entry.</b> Press this key for more than 2 seconds to enter set / limit values.</p>	Page 29, 80
	<p><b>Alphanumeric keys.</b> Alphanumeric data entry.</p>	
	<p><b>Delete.</b> Deletes the last entered digit.</p> <p>Press this key for more than 2 seconds to clear the data on the display during data entry.</p>	
	<p><b>Enter.</b> Save the data and go to the next step.</p> <p><b>Print.</b> By pressing this key, weight data is transferred to a printer or to PC</p>	Page 38, 108

## 4 INSTALLATION

**PRECAUTION:** Please read this section carefully before installation of the instrument. Applying the recommendations in this section will increase your system reliability and its long-term performance.

### 4.1 Recommendations

#### 4.1.1 Environment

**Warning:** Please observe the following warnings for designing your area of operation, which will increase your system reliability.

The weighing indicator should be placed in a clean area, avoid direct sun light, if possible, ideal ambient temperature between -15 °C and +50 °C, humidity not exceeding 85% and non-condensing. All external cables should be installed safely to avoid mechanical damages.

This instrument is a very low-level signal measuring instrument. To avoid electrical noise, it should be separated from equipment that produces electrical noise. The instrument body shall be connected to a good ground to counter electromagnetic disturbances. Load cell cable must be separated from other cables, if possible. If there is noise-generating equipment such as heavy load switches, motor control equipment, inductive loads etc., please be careful to avoid EMC interference. Connect parallel reverse diodes to the DC inductive loads like relays, solenoids etc. to minimize voltage peaks on the DC power lines.

#### 4.1.2 Cabling

All cables coming to the instrument must be of high quality and shielded. Distance from load cell cables, interface cables and DC power supply cables to power line cables must be minimum 50 cm. The separate cable tray usage for these low signal level cables is strongly recommended.

For cable connections of different thicknesses, as seen below there are 3 interlocking gaskets with different diameters, indicated as B, C, and D, inside the glands used in the FT-111 (D) weighing terminal. Depending on the thickness of the cable, remove the gaskets B and C respectively, pass the cable through the gland and tighten it. In this way, wires ranging in thickness from 4 to 8 mm can be easily connected to the terminal using the same gland with the appropriate sealing combination.

To maintain the immunity of the device against electromagnetic interference, the cable shields should be connected to the grounding pins inside the device, shown in Figure 4.2.

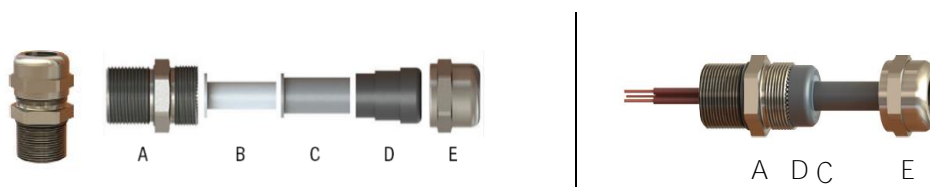


Figure 4.1– Seal combination and mounting of gland assembly

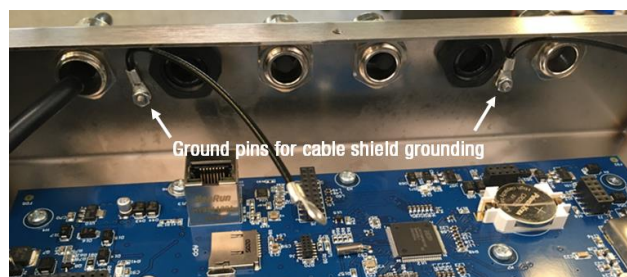


Figure 4.2 - Ground pins in FT-111 (D) for cable shield grounding

**Warning:** Incorrectly closed back cover and poorly tightened glands may be unwanted results with loss of IP rating and safety. Tighten the glands' cup nut with minimum 5Nm torque.



### 4.1.3 Electrical Connection Recommendations

1. Always remember that FT-111 (D) terminal is very low voltage measuring instrument used in the industrial environment. Your proper installation increases the reliability and performance of the instrument.
2. Only a trained person should interface the instrument due of the 230 VAC voltage in the instrument and against malfunction at installation.
3. If the energy condition of your plant is not good enough, prepare a special power line.
4. The quality of your plant grounding will provide weighing accuracy and the safety of FT-111 (D). If grounding of your plant is not good enough, prepare a special power line and grounding.
5. Power off the instrument before connecting or disconnecting any peripheral instrument.
6. The shielded cable and ground connection of the shield will increase the immunity of FT-111 (D) against electrical disturbances. Shields of cables should be connected to the grounding pins in FT-111 (D).
7. All required electrical connections should be done as described in the installation section, page 20. If you need to service the terminal, turn the power off and wait at least 30 seconds before opening housing.

### Location of the Peripheral Connections

The electrical terminals of the main board are shown in the 2 pictures below.

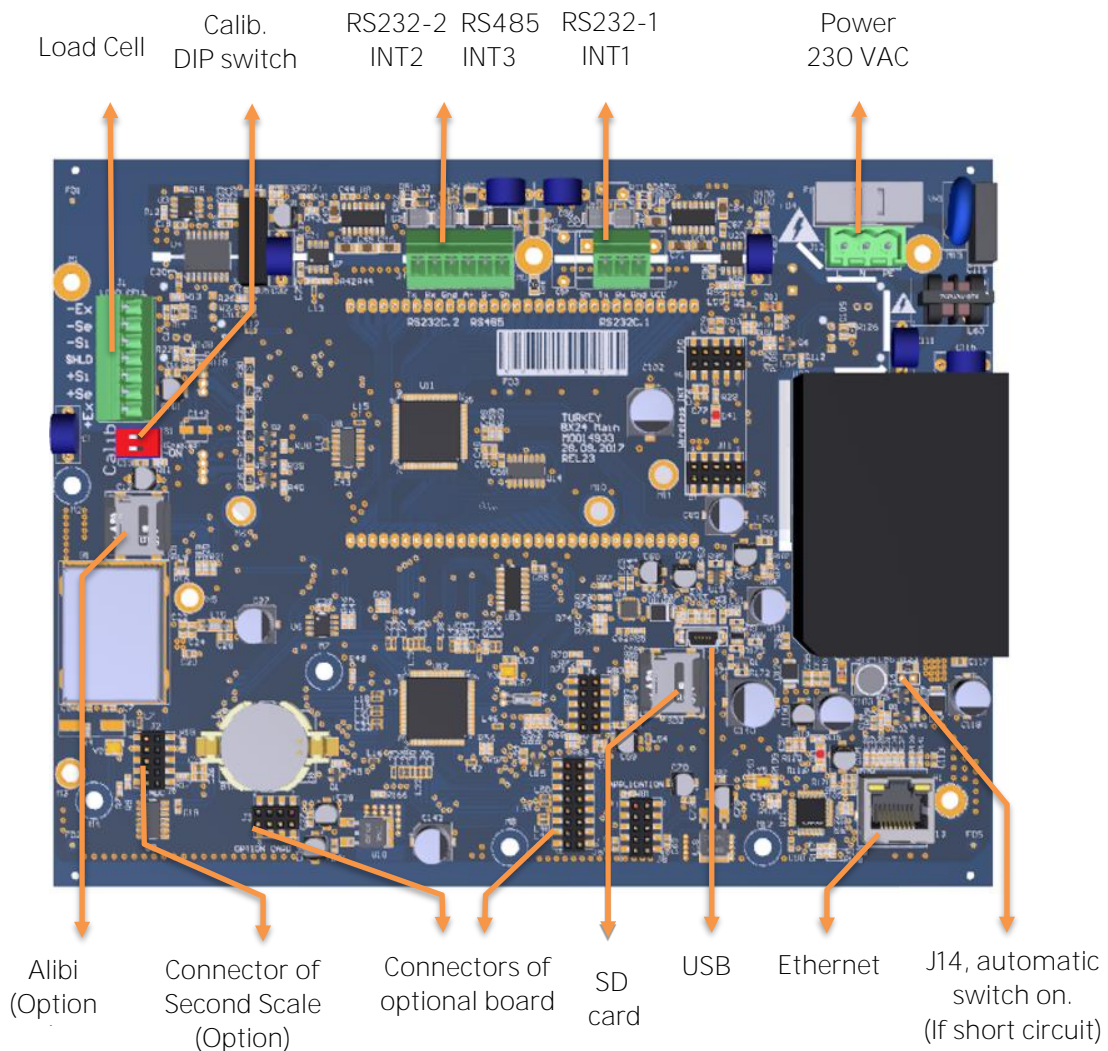


Figure 4.3 – FT-111 The main board

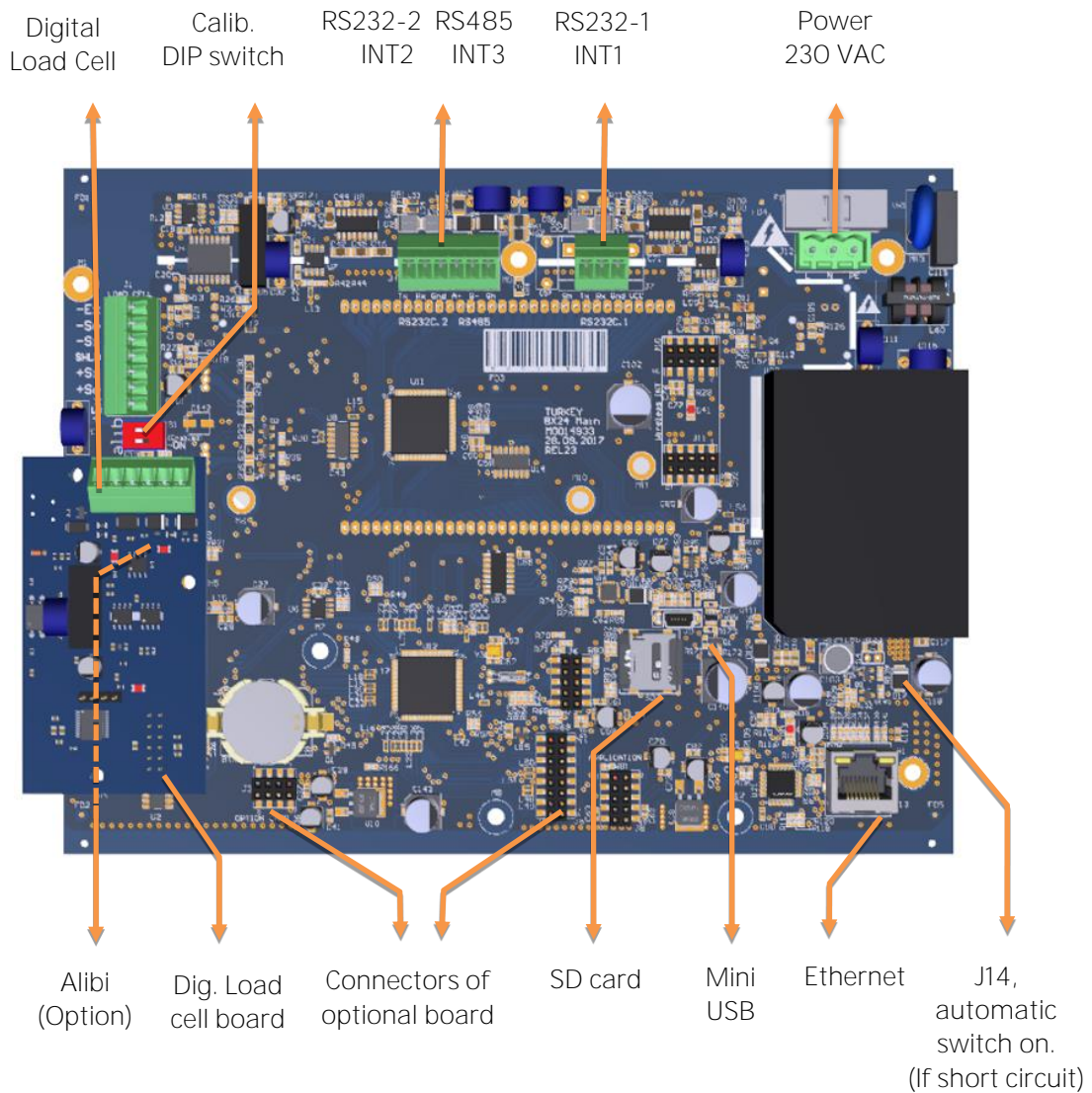


Figure 4.4 – FT-112D main board

## 4.2 Installation Steps

Follow the steps below carefully to install the instrument.

### Step 1: Preliminary Preparations

Before starting the installation,

1. Select the weighing terminal location. Refer to recommendations in the previous section.
2. Prepare the Protective Earth (PE) cable to grounding the FT-112 (D) housing. The protective earth should be as good as possible for scale reliability.
3. Prepare the required power source near the weighing terminal.
4. Prepare the cabling tray, pipe etc. from platform to the weighing terminal.

### Step 2: Mechanical Installation

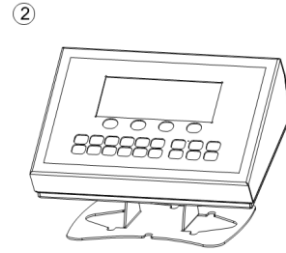
Be sure that the mechanical installation of the instrument is done properly for long time operation life and suitable for the electrical installation as described below. Installations of the desk type and wall type housings are identical due to same kits' usage as shown below.

If you use the weighing terminal on a desk without additional mechanical hardware, place the instrument on the desk. Go to the next step.

## Wall mounting kit for desk use.



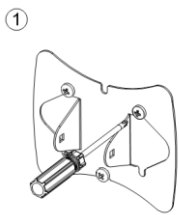
Install the mounting kit on the rear of the instrument with 4 pcs M5 x 15 mm screws.



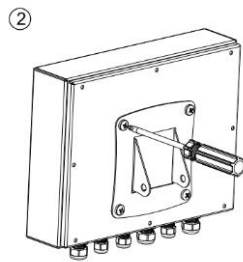
Place the weighing terminal on a desk after adjusting the view angle.

## Wall mounting

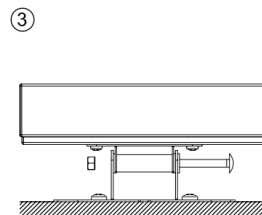
Dismount the wall mounting kit before installation and follow the steps below.



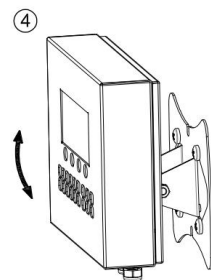
Install the wall mounting part of the kit to the wall with 3 screws.



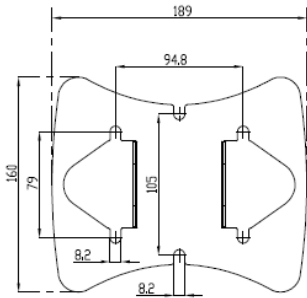
Install the supplied bracket in the kit to the rear of the instrument with 4 x m5 x 15mm screws.



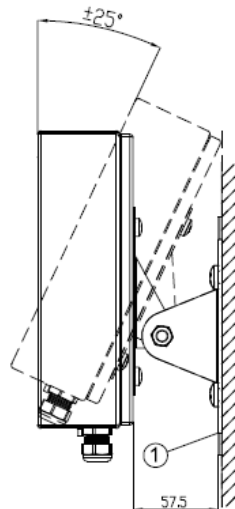
Reassemble the wall mounting kit as seen in the picture.



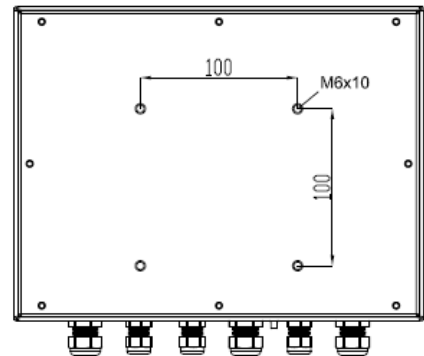
Adjust the angle of weighing terminal.



Mounting part



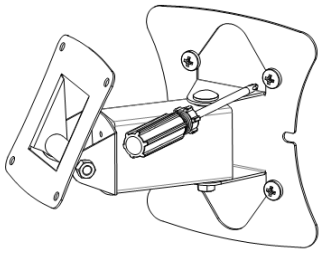
Side view



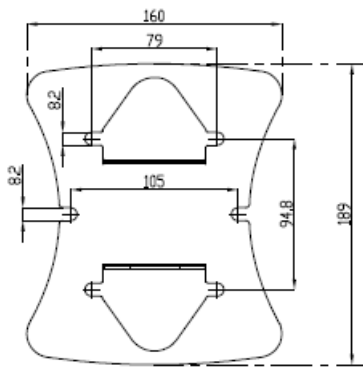
Rear part of indicator

## Wall mounting with 2D kit

①

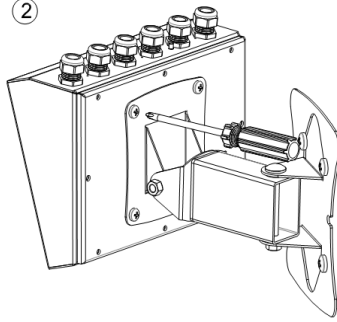


Install the mounting kit to the wall with 4 pcs screws.

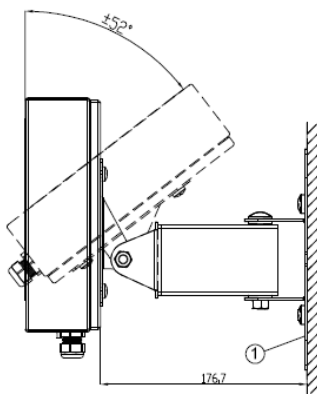


Mounting Bracket

②

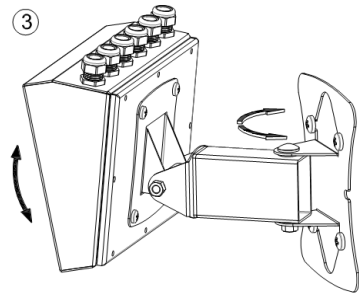


Install the mounting kit to the rear of the instrument with 4 of M5 x 15 mm screws.

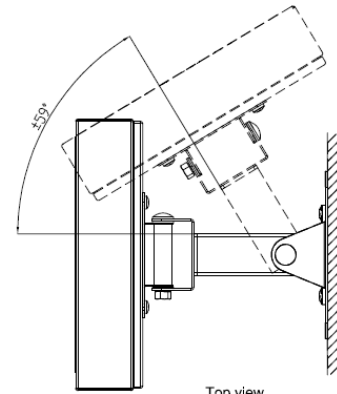


Side view

③



Adjust the weighing terminal's direction and angle.

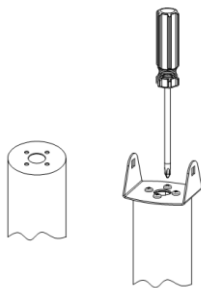


Top view

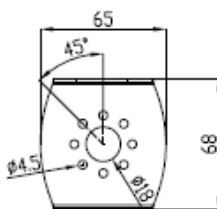
## Column mounting

Dismount the column mounting kit before installation and follow the steps below.

①

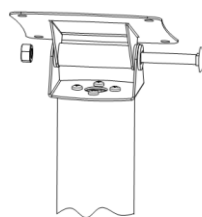


Install the small part of the kit to the column.

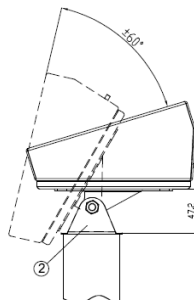


Mounting part

②

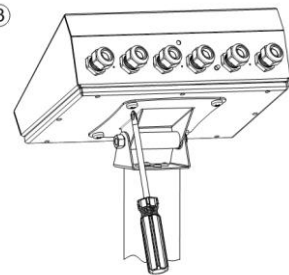


Assemble the kit as seen in the picture.



Side view

③



Use 4 pcs M5 x 15 mm screws for installing.

### Step 3: Open the Housing / Close the housing

Be sure that the mechanical installation of the instruments is done properly, and environment is convenient to open the housing.

Open the housing from its rear. The rear part of the housing will be hanged to two stainless steel wires connected to body.

**Warning:** *Incorrectly closed cover and poorly tightened glands may be unwanted result with loss of IP rating and safety. Close the cover's bolts with minimum 1.5 Nm torque.*

### Step 4a: Analogue Load Cell Connection (FT-112)

To avoid damage, the load cell wiring should be done carefully before energizing the instrument. Load cell connection details are shown in Figure 4.6. In 4-wire installations the sense and excitation pins with the same polarity **should be short circuited** at the connector side. If you have a junction box in your system, use 6-wire cable between FT-112 and the junction box, and short circuit these pins at junction box for better performance.

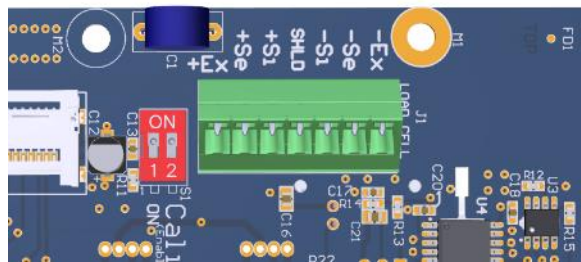
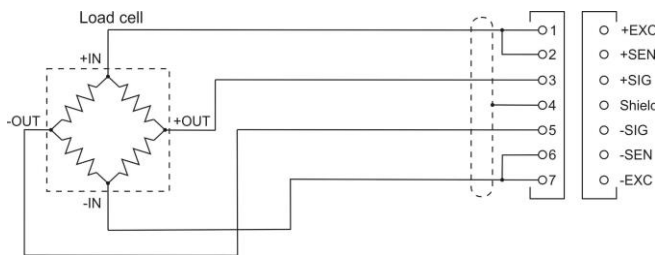
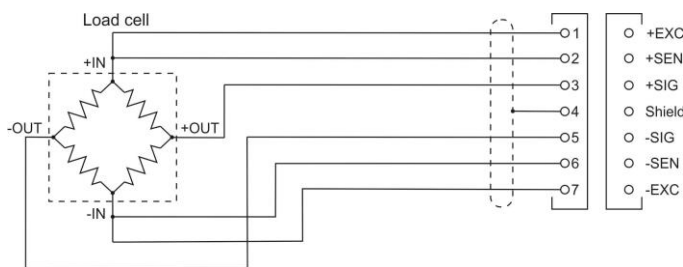


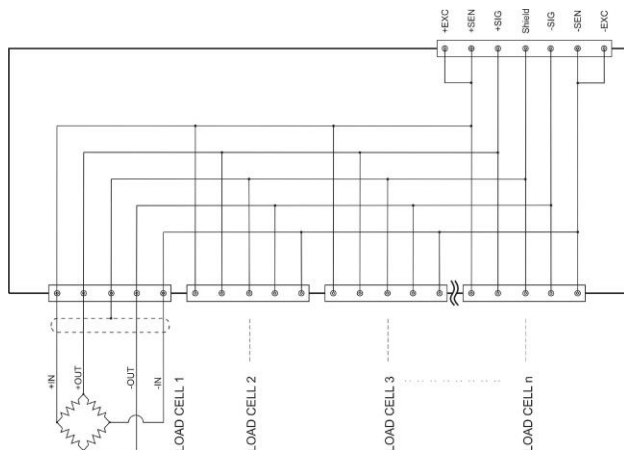
Figure 4.5- The load cell connector



4-wire load cell connection



6-wire load cell connection



Junction box connection

Figure 4.6 – The load cell and junction box connection

**Warning:** Always connect Sense pins to Excitation pins for 4 wire connection. Un-connected sense pins may cause incorrect Excitation voltage measurement and create an accuracy problem.

**Warning:** Connect the load cell cable shield to the housing (recommended to increase the EMC immunity against disturbances) or shield pin of the load cell connector.

**Step 4b: Digital Load Cell Connection (FT-112D) and LPK24**

The digital load cell wiring should be performed carefully before energizing to avoid damages to FT-112D and load cells. The instrument cable between the instrument, LPK24 Lightning protection box and load cells must be shielded and suitable for high speed RS485 interface. The wire diameter of the instrument cable should be selected for max. 1V drop between the load cells and LPK24 lightning protection box.

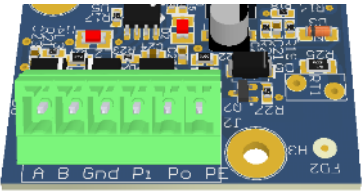
	Pin number (Terminal J2)	Definition	Description
	1	A	+ RS485 for DLC interfacing
	2	B	- RS485 for DLC interfacing
	3	GND	Ground
	4	P <sub>in</sub>	Power input (from LPK24)
	5	P <sub>out</sub>	Power output (to load cells via LPK24)
	6	PE	Protective Earth

Table 4-1 – Pin configuration of the digital load cell board’s terminal (FT-112D)

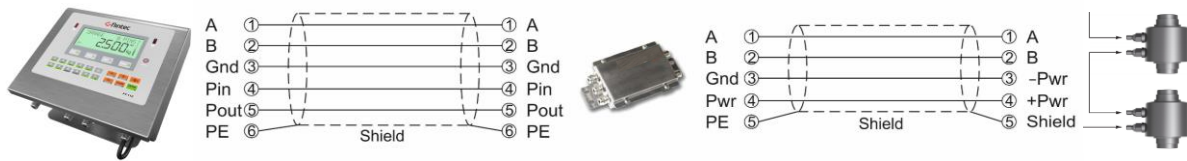


Figure 4.7 – FT-112D connection with LPK24

**Important Note**

Since the supply voltage of the digital load cell is isolated, its Ground (0 VDC) should NOT be connected to another ground or PE-Protective Earth!!!

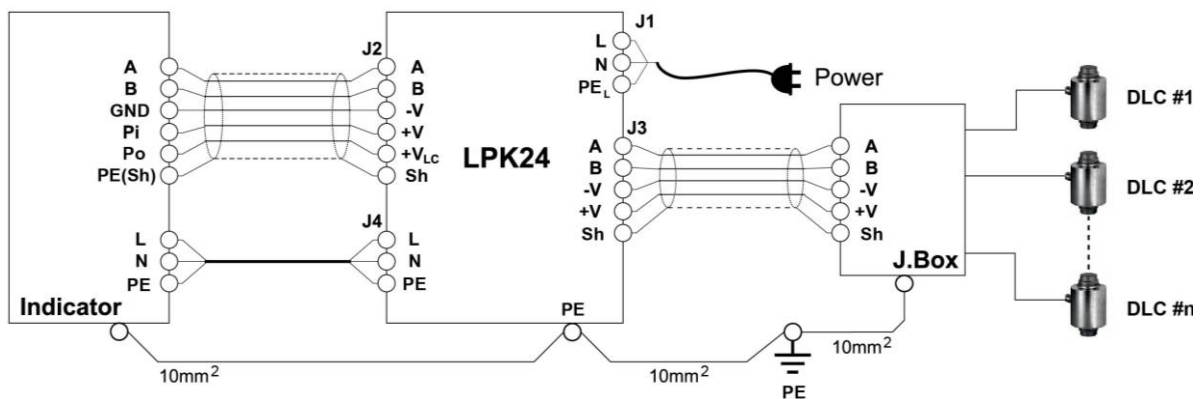


Figure 4.8 – FT-112D, LPK24 and RC3D connection with junction box

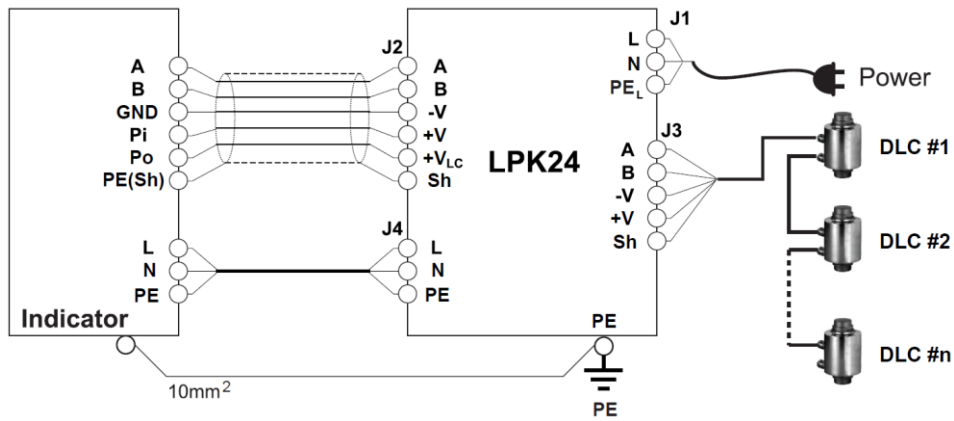


Figure 4.9 – FT-12D, LPK24 and RC3D v2 connection without junction box

### Step 5: Second Scale Connection (FT-112)

If your instrument has the optional second scale board, connect the second platform to the terminals on this board.

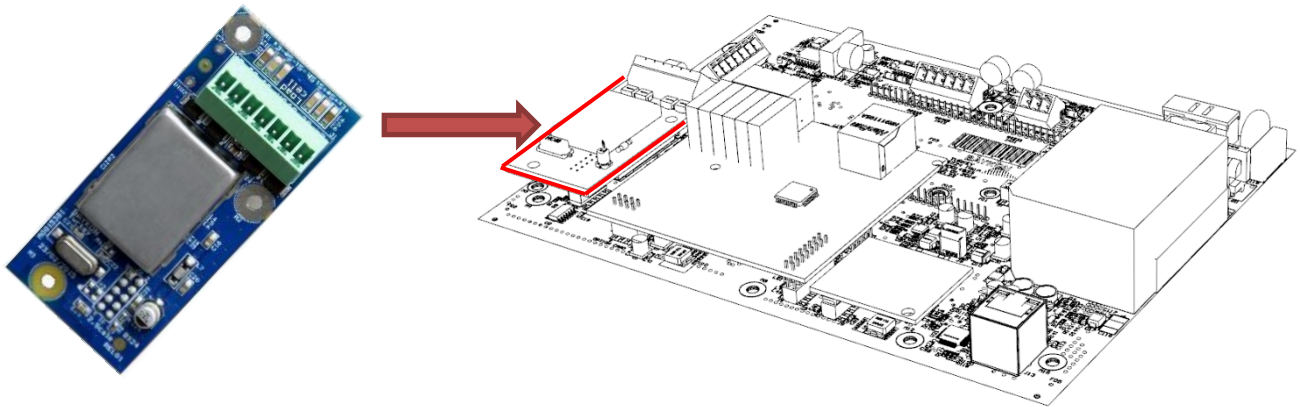


Figure 4.10 - The load cell connector on the second scale board.

The pin configuration of load cell connector on the second scale board is the same as the pin configuration of the load cell connector on the main board. Follow descriptions in the load cell connection in section 4.3.2.

**Step 6: RS 232C Serial Ports (Interface 1 and Interface 2)**

FT-112 weighing terminal has 2 x RS232C serial ports on the main board which are galvanically isolated from other circuits to increase the EMC immunity. RS232C serial ports are named as RS232C-1 and RS232C-2 in set up menu and as Int 1 and Int 2 on the electronic board sequentially. The usage of these serial ports and specifications are shown in the Table 4.2 and their pin configuration is shown in Table 4.3.

Usage	Interfacing with printer, PC, PLC, Bar code reader, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol, Barcode&ID device or Modbus RTU,
Baud rate	1200 / 2400 / 4800 / 9600 (Default) / 19200 / 38400 / 57600 bps
Length	7 or 8 (default) bits
Parity	Even, Odd or No (default)
Start / Stop bits	1 start bit and 1 stop bit

Table 4.2 - RS 232C Serial Interface Specifications

Definition	RS232- 1 Pin number (Terminal J7)	RS232-2 Pin number (Terminal J4)
RXD	2	1
TXD	3	2
GND	4	3

Table 4.3 – Pin configuration of RS 232C terminals

**2 wire connection to peripherals:** RS 232C serial connection is done with two wires as indicated below in Figure 4.11 – 2 wire RS 232C connection with a printer if there is no data entry to the weighing terminal. Typical applications are printer and barcode reader connections.

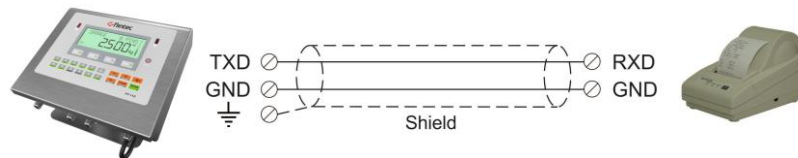


Figure 4.11 – 2 wire RS 232C connection with a printer or PC

**3 wire connection to the peripherals:** RS 232C serial connection is done with three wires as indicated below in Figure 4.12 for bi-directional interfacing. Typical application is bi-directional BSI format interfacing with PC or PLC.

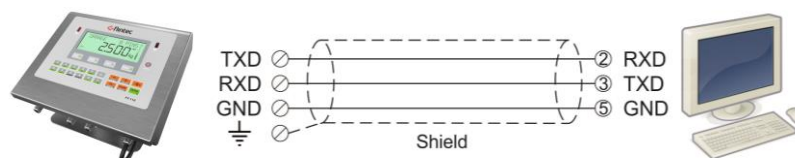


Figure 4.12 – 3 wire RS 232C connection with a PC or PLC



### Step 7: RS 485 Serial Port (Interface 3)

FT-112 weighing terminal has RS485 serial port on the main board. The use of this serial port and specifications are shown in the Table 4.4 and its pin configuration is shown in Table 4.5. RS485 serial port is named as Int 3 on the main board. Refer to page 44 to configure RS485 serial port and page 107 for details on data formats.

Remember 120-ohm line termination resistors should be installed on both ends of the RS 485 line.

Usage	Interfacing with Printer, PC, PLC, Bar code reader, remote display etc.
Data formats	Continuous, Fast Continuous, printer, BSI Protocol, Barcode&ID device or Modbus RTU,
Baud rate	1200 / 2400 / 4800 / 9600 (Default) / 19200 / 38400 / 57600 bps
Length	7 or 8 (default) bits
Parity	Even, Odd or No (default)
Start / Stop bits	1 start bit and 1 stop bit
Address	Programmable between 01 .... 99
Max quantity	Maximum 31 instruments on the line.
Cable length	Maximum 1000m.

Table 4.4 - RS485 Serial Interface Specifications

Definition	RS485 Pin number (Terminal J4)
A	4
B	5
Shield	6

Table 4.5 – Pin configuration of RS 485 terminal

RS485 serial connection is done with two wires as indicated below in Figure 4.13.

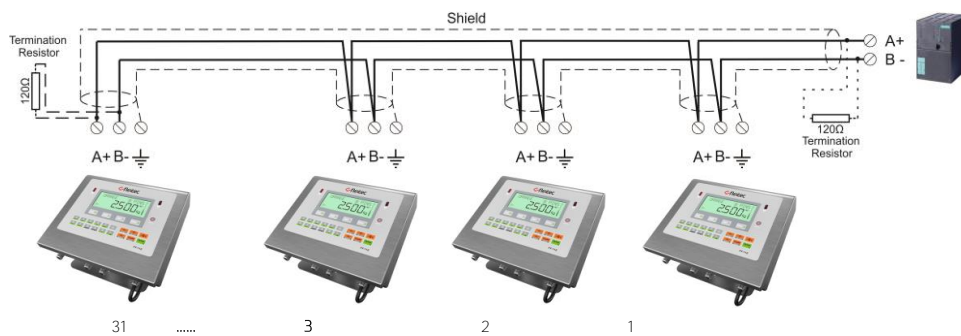


Figure 4.13 – Multi-instrument connection with PLC Analogue connection

### Step 8: Analogue Output

Analogue connections are done as indicated below in Figure 4.14 and Figure 4.15.

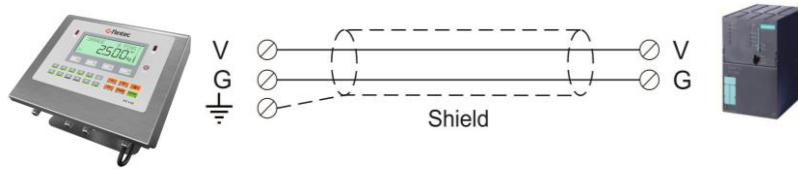


Figure 4.14 - Voltage output connections

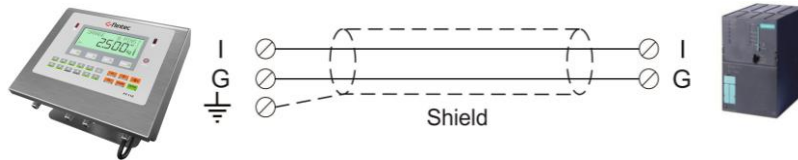


Figure 4.15 - Current output connections

### Step 9: Ethernet TCP/IP

The use of the Ethernet port on the main PCB and its data formats are shown in the Table 4.6. Its pin configuration is shown in Table 4.7. Refer to **page 46** of the manual to configure this interface.

Usage	Interfacing with Printer, PC, PLC, Bar code reader, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol, Barcode&ID device or Modbus TCP

Table 4.6 – Data formats of Ethernet port

Pin number (Terminal J13)	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data -
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data -
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

Table 4.7 – Pin configuration of RJ45 Ethernet connector

The HUB connection cabling will be a direct connection as shown below:

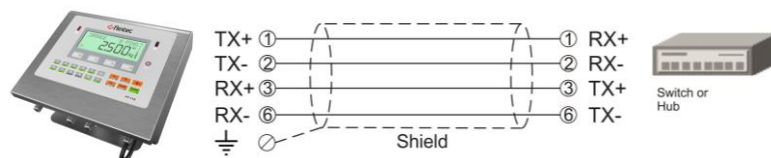


Figure 4.16 - HUB connection

The PC connection cabling will be done via cross-over cable as shown below. IP address blocks and gateway address of FT-112 and PC should be the same in cross connection.

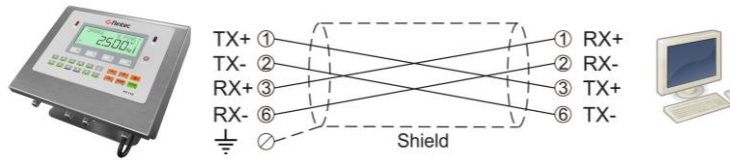


Figure 4.17 - Cross PC connection

**Warning:** Connect the shield to the reference ground or shield pin of the power connector.

**Warning:** Disconnect FLINTEC set up software before Ethernet interfacing.

### Step 10: USB port

The use of the on-board USB 2.0 and its specifications are shown in Table 4.8. You need the mini-USB cable to connect the weighing terminal to the peripheral instrument. Refer to **page 45** for USB port configuration.

Usage	Interfacing with PC via USB 2.0
Data formats	Continuous, Fast Continuous, BSI Protocol

Table 4.8 – Data formats of the USB port

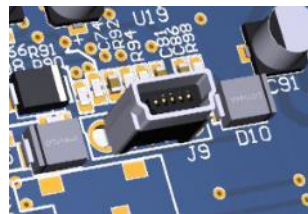


Figure 4.18 – Mini USB port connector

### Step 11: Power Source Connection and Grounding

The weighing instruments measures very low signal levels. The quality of the power line will determine the accuracy and the safety of your measuring system. It is very important that the instrument should not share power lines with noise-generating parts such as heavy load switching relays, motor control equipment, inductive loads, etc. If the condition of the power supply in the plant is poor, prepare a special power line and grounding. Before connecting the power source check if its voltage is the same with the voltage written on the weighing terminal.

Pin number	AC Power (Terminal J12)	DC Power (Terminal J15)
1	L	+24 V
2	N	0
3	PE	PE

Table 4.9 – Pin configuration of power supply connector

If the voltage is correct

1. Connect the grounding screw near glands to the good ground.
2. The 90 – 240 VAC supplied instruments are shipped with installed power cord which is ended with a plug. Energize the instrument after checking all electrical and grounding connections.
3. The 24 VDC supplied instruments are shipped with installed 2-meter power supply cable. Connect this cable to power supply as shown in Table 4.9.
4. Energize the instrument.

If your power source is not correct, do not connect the scale to the power source and contact your authorized representative.

## 4.3 Cleaning

**Warning.** *Safety Notice: Disconnect the instrument from power source before cleaning. Be sure to Cover any open glands.*

FT-112 instrument is designed for use in wet, hygienic and harsh environment. To maintain the instrument, never use harsh abrasive cleaners or solvents. Wipe the instrument with a slightly damp, soft cloth using warm soapy water or mild detergent.

## 4.4 Disposal

In conformance with the European Directive 2002/96 EC Waste Electrical and Electronic Equipment (WEEE), this device may not be disposed of with domestic waste. This rule also applies to the non-EU countries, according to their specific regulations. Please dispose of this product in accordance with local regulations at a designated collection point specified for electrical and electronic equipment. For your questions, please contact the responsible local authority. Thank you for your attention to environmental protection.

# 5 FT-112 FUNCTIONS

## 5.1 Basic Functions

### Switching on



The instrument will be switched on after pressing the power on / off key. The weighing indicator will start the weighing operation after displaying the **model's** name and software version, load date and display testing. If the jumper J14 is short circuited, the automatic power-on is active and the ON-OFF switch is disabled.

### Switching off

The instrument will be switched off after pressing the power on / off key for more than 2 seconds. [ - OFF - ] message will appear for a short time on the display before power off.

### Zeroing

Zeroing corrects the drift of the unloaded scale from the zero point.

1. Unload the scale.
2. Press  key.
3. Centre of zero appears with **>0<** symbol on the display.
4. Check the center of zero sign on the left of the display. If it doesn't appear, press the  key once more for correct zeroing.

Zeroing is available in a limited range. Parameter 514, page 64.


### Automatic zero-point correction

Zero point will be corrected automatically for minor deviations if the change is within the range of limited zeroing range value. Disable this correction at the applications like tank weighing, batching, filling etc. against wrong zeroing at feeding. Refer to Automatic Zero Tracking **parameter 515, page 64**.

Automatic zero-point correction range is limited together with zeroing range above.

### Automatic zeroing at power on

Zero point will be corrected automatically at power on of the instrument to compensate for any zero drift of the scale if the scale is permanently on and unloaded. This feature should be disabled for tank, silo, hopper scales etc. Power on zero has a limited range and the instrument displays is active [ POWER ON ZERO ERR ] error prompt is active if the zero function exceeds the zero limits.

Press  key to start indication without zeroing and call service. If the range exceeds 3%, the residual drift cannot be displayed. Refer to Power on Zero **parameter 513, page 63**.

### Basic weighing

1. Zero the unloaded scale.
2. Place test weights on the scale.
3. Wait until the motion monitor disappears.
4. Read the weighing result.

If the loads are out of the indication range the below prompts are displayed.






Below the negative indication limit



Over the positive indication limit

## Net weighing in a container

Taring is used to tare the weight of a container before filling it.

1. Place an empty container on the scale and press  key.
2. The zero display and the NET symbol appear.
3. Check  sign on the display. If it doesn't appear, press the  key once more for correct taring.
4. Add the material in the container and follow its weight in net.

## Clearing the tare

Press  key. The NET symbol disappears, and Gross symbol appears on the display together with the gross weight indication.

## Automatic taring

The scale tares automatically and NET is displayed, after placing a weight on the empty scale, if this feature is enabled. Refer to **parameter 232, page 54**. The weight should be heavier than the value entered to the **parameter 518, page 64** for automatic taring.

## Automatic clear

The tare is automatically cleared after emptying the scale, only if this feature is enabled. Refer to **parameter 233, page 54**.

## Specified tare PT (Preset Tare)

If you know the weight of the container, you can enter the tare value numerically instead of taring with key. This advanced feature is described on **page 30**

## Tare status save at power off




This function saves the tare status at power off and the instrument operates in Net at power on. This feature is used for tank and silo weighing applications. Refer to **parameter 234, page 54**.

## Printing


Press enter key when the item is on the scale and weight is stable to print the label.

## 5.2 Advanced Functions

### Programmable keys

The keys ,  and  are programmable and will ease the operation of the instrument. The programmable functions are high resolution, temporary gross indication, unit change, scale select etc. Refer to sub-block 24-, **page 55** to see the possibilities.

### High resolution

By programming a key for high resolution, the weight value will be displayed 10 times higher until the key is pressed again. On approved scales, High resolution is displayed temporarily for 5 seconds. High resolution cannot be printed. Default key is  key. Refer to **parameter 241, page 55**.

### Unit change

By programmed a key for Unit change, switching the displayed weight units from metric to imperial or vice-versa is possible. Unit change is possible between kg and lb, and between g and oz. Refer to sub-block 24-, **page 55**.

## Dynamic weighing

*APPLICATIONS: Living stock weighing, weighing of unstable load, unstable industrial weighing systems.*


*RELATED PARAMETERS: Sub-block 33-, **page 58**.*

Dynamic weighing can be programmed for single weighing or continuous weighing.

Single weighing is used for dynamic weighing applications such as the weighing of live animals.

Continuous dynamic weighing can be used for loads with very high vibrations like reactors which are equipped with high-speed mixers or, conveyors etc.

Single weighing operation:




1. Place container on the scale.
2. Press  key to tare the scale.
3. Load the scale.
4. Press the dynamic weighing key to start dynamic weighing. Or dynamic weighing will start automatically if the load is heavier than 50 divisions. Refer to **parameter 331**.
5. After the weighing cycle, the dynamic weight value is displayed.
6. Unload the scale or press the dynamic weighing key to reset dynamic weighing operation.

Dependent on the operation type selected at **parameter 331**, the dynamic weighing may start automatically if the load is heavier than minimum weight or may end after unloading the scale (refer to **page 64**).

## Specified tare PT (Preset tare)

If you have specified containers, you may enter their weight value numerically as a preset tare (PT) value to use this value for taring the scale. This feature eliminates the need for taring of empty containers to measure the net material value, this will reduce your operation time by only weighing the nett weight into the containers. To use this feature, preset taring feature should be enabled. Refer to **page 54**.









Preset Taring with numeric entry:

1. Press  key for more than 2 seconds.
2. Enter tare value numerically.
3. Press  key for taring or press  key to escape.



## Specified tare (PT) memory








If you have specified containers which are used frequently and if you prefer to enter their weight value for taring instead of taring each time, you may record their weights into the Preset tare memory. Up to 500 specific tare values can be recorded.

### Recording the specific container weight into the preset tare memory







1. Press  key for more than 2 seconds in basic weighing. The [ MEMORY ] message will appear on the display.
2. Press  key to enter memory. The last entered specific tare code is displayed as [PT : 111 ].
3. Press numeric keys to enter the specific tare code. Or press  or  key to navigate in the memory. Press  key to access PT memory code shown on the display.
4. The previous specific tare value appears on the display. Enter the new value by pressing numeric keys. Press  key to save or press  key to escape.
5. After saving the entry the next memory code is shown. Follow from item 3 to enter PT values to other codes.
6. Press  key to return to the operation.

### Record the indicated value into the preset tare memory

1. Empty the scale and press  key until **>0<** symbol will appear on the display.
2. Place the container on the scale.
3. Press  key for more than 2 seconds in basic weighing. The [ MEMORY ] message will appear on the display.

4. Press  key to enter memory. The last entered specific tare is shown as [ PT : 111 ].
5. Press numeric keys to enter the preset tare memory code. Or press  or  key to navigate in the memory. Press  key to access PT memory code shown on the display.
6. The previous specific tare value appears on the display. Press  key to save indicated weight to the PT memory.
7. Press  key to confirm.
8. Press  key to return to operation.

### Taring from the preset tare memory

1. Press  key for more than 2 seconds and  key in sequence in basic weighing to enter PT memory.
2. The last entered preset tare memory code will appear.
3. Press numeric keys to enter the preset tare memory code. Or press  or  key to navigate in the memory.
4. Press  key for specific taring. Or press  key to return operation.







### Totalization

FT-112 can be used for horizontal or vertical totalization operations. The vertical totalizing is used to totalize materials weighed into the same container. The horizontal totalization is used for weighing materials into separate containers or for totalizing the sequential weighing. Totalization weighing is limited to 99 items. Refer to **page 58**.






You can follow the weighted items by pressing  and  keys at total value displaying.

### Horizontal totalization

**APPLICATION:** Accumulation of the following weighings. Using automatic tare function (**parameter 232**) and automatic clear tare (**parameter. 233**) are suggested in horizontal totalization to avoid incorrect weighings, if applicable. Refer to **parameter 324**.

1. Press the  key for zeroing the empty scale before loading it
2. Load a container on the scale
3. Press  key for weighing material as net
4. Add the material into the container
5. Press  key for totalizing and unload the container
6. Load the next container onto the scale
7. Repeat from item 3 to weigh the following materials
8. Press  key to display the total value
9. Press  key for printout of the totalization ticket or press  key to go to the totalization back to item 3

### Delete the total

1. Press  key to display the total value
2. Press  key for the second time when the total is displayed
3. Press  key and [ Delete ? ] prompt appears
4. Press  key to delete total and item weights, or press  key to exit without deleting the total

If you enter a preset tare value a specific tare can be used for totalization.

[ C 5 MR: 5.003 KG ] displays the print out sample

FLINTEC GmbH.	
www.flintec.com	
Meckesheim, Germany	
Date	25.05.2022
Time	09:16
CN	34
OPERATOR	
Max Mustermann	
MATERIAL	
POLYETHYLENE	
1 Tare	0.102 kg
Net	1.000 kg
2 Tare	0.100 kg
Net	1.001 kg
3 Tare	0.099 kg
Net	1.000 kg
4 Tare	0.100 kg
Net	1.003 kg
5 Tare	0.099 kg
Net	0.999 kg
-----	
TOTAL	
Gross	5.503 kg
Tare	0.500 kg
Net	5.003 kg









## Vertical totalization






**APPLICATION:** Totalization of the materials batched in the container. We recommend using automatic tare function (**parameter 232**) and automatic clear tare (**parameter 233**) in this application to avoid incorrect totalizing, if applicable. Refer to **parameter 324**.

**Important note:** Tare function should be programmed as multitare "MULT" for vertical totalization. Refer to **parameter 231**.

To weigh or to add materials into the same container adjust **parameter 324** to vertical and follow the sequences below.

1. Press the  key for zeroing the empty scale before loading it
2. Load the container onto the scale
3. Press  key for weighing material as nett. If the automatic taring function is activated and if minimum tare weight (**parameter 518**) is lower than tare weight the scale will tare automatically
4. Add the first material into the container
5. Press  key for totalizing. The scale will be tared automatically after saving the item weight
6. Add the next material into the container. Repeat step 5 to add further materials until the end of totalization
7. Press  key to display the total value
8. Press  key for printout totalization ticket or press  key to proceed on totalization from item 3

### Delete the total

1. Press  key to display the total value.
2. Press  second key when the total is displayed
3. Press  key and [ Delete ? ] prompt seen
4. Press  key to delete total and item weights or press  key to exit without deleting the total.

If you enter a preset tare value a specific tare can be used for totalization.

[ C 8 MR: 4.206 KG ] displays the print out sample.

FLINTEC GmbH	
www.flintec.com	
Meckesheim, Germany	
Date	25.05.2022
Time	09:24
CN	54
OPERATOR	
Max Mustermann	
MATERIAL	
POLYETHYLENE	
Tare	0.201 kg
1 Net	0.599 kg
2 Net	0.604 kg
3 Net	0.600 kg
4 Net	0.600 kg
5 Net	0.600 kg
6 Net	0.499 kg
7 Net	0.402 kg
8 Net	0.302 kg
-----	
TOTAL	
Gross	4.407 kg
Tare	0.201 kg
Net	4.206 kg
* Thank you *	

## Statistical report in Totalization

This instrument calculates statistical values average weight, standard deviation, relative statistical deviation, Max, Min and Range of totalization for online inspection of the weighing terminal. Parameter 16A should be selected as 'YES' to print statistical results with totalization printout.




## Totalization of Piece Counting

Totalization can be done in piece counting. The FT-112 has two totalization memories which totalize in weighing and totalize in counting. Each totalization feature can be activated in the related operation e.g. totalization in kg can be done or displayed only in basic weighing.





## Grand Total

The grand total displays the total weight of all weighings. This function accumulates weighing of items after every printout.

### Display the Grand Total

1. Press the  key for more than 2 seconds
2. The grand total appears on the information display as [GT: 12345678901 kg ]
3. Press  key to print the grand total value
4. Press  key to leave the operation or 15 seconds later the grand total indication will appear on the display

### Delete the Grand Total

1. Press the  key for more than 2 seconds
2. Press  key when the grand total is displaying
3. [ Delete ? ] prompt appears
4. Enter the key password if programmed. Refer to **parameter 325**
5. Press  key to delete or press  key to exit without clearing the total.

## Touch free IR keys

**APPLICATION:** For contactless operation of the instrument without physical touching of the keyboard. Programmable operation of the following functions: zeroing, taring, print etc. with dirty or hygienic environment, for example poultry portion scale, scale use with gloves etc.

**RELATED PARAMETERS:** *Parameters 244 and 245.*






IR keys are used to operate without touching the scale. Set left and right IR key functions for your usage. Available functions of IR keys are ID1, ID2, M+, MRC, Zeroing, Taring, Clear, Taring/Clear, Print

The sensitivities of IR keys can be adjusted for your operation.





## Date and Time

**RELATED PARAMETERS:** *Parameters 251, 252 and 253.*





### Date format of the country

1. Enter programming and go to **parameter 251, page 56**.
2. Press  key to select date format: DMY (DD.MM.YYYY), MDY (MM.DD.YYYY) or YMD (YYYY.MM.DD) and press  key to confirm
3. Press  key until [ SAVE : YES ] prompt appears
4. Press  key to save or press  key to select "NO" to return to the operation without saving.

### Date adjustment

1. Enter programming and go to **parameter 252, page 56**
2. Press numeric keys to enter the date and press  key to confirm
3. Press  key until [ SAVE : YES ] prompt appears
4. Press  key to save or press  key to select "NO" to return to operation without saving

### Time adjustment

1. Enter programming and go to **parameter 253, page 56**
2. Press numeric keys to enter the time and press  key to confirm
3. Press  key until [ SAVE : YES ] prompt appears
4. Press  key to save or press  key to select "NO" to return to operation without saving.

## ID device

**APPLICATION:** FT-112 can be connected to the ID device like bar code reader, card reader, RFID device etc. to read identification data, specific tare value, APW value etc.

**RELATED PARAMETERS:** Sub-block 18- .

You may enter the alphanumeric data from ID device instead of keypad. The ID device can be connected to RS232C and RS485 interface. The data format of the ID device is;

[STX] [ PREFIX ] [ DATA ]

For example, in the bar code below, prefix is ABCD and the preset tare weight data is 12345 and their length will be entered 4 and 5 in sequence in **parameter 182 and 183**.



The default data format is no stx, no prefix, 32-digit data.

## Tilt switch

Tilt switch feature should be enabled for legal for trade mobile platform scales which are equipped with wheels. Connect tilt switch to the Input 4 of the instrument and enable tilt switch by the **parameter 51A**.






The [ DUE TO TILTING ] [ ----- ] messages are displayed if permissible platform tilt angle is exceeded.

## Language

**RELATED PARAMETERS:** *Parameter 236*.

Operation and printout language of the instrument may be set. The available languages are English, German, French, Italian, Spanish and Turkish.

### Language selection

1. Enter the programming and go to **parameter 236, page 54**
2. Press  keys to select language and press  key to confirm entry
3. Press  key until [ SAVE : YES ] prompt appears
4. Press  key to save or press  key to select "NO" to return to operation without saving

## Bar graph displays the scale capacity during basic weighing

The bar graph on the right of the display rises related to the scale load in Gross even if the scale displays in Net. The usage of the scale capacity in percent and the available range are shown on the bar graph. In the example below 70% of the capacity is used and 30% is available.



## 5.3 Backup and Restore (with SD card)

RELATED PARAMETERS: *Sub-block 96*


**IMPORTANT NOTE:** *To back up FT-112 (D), use an SD card with 16Gb maximum and formatted as FAT32. For FAT32 formatting, click the "Restore device defaults" and uncheck the "Quick format" box on the PC.*

Set-up and calibration data of the FT-112 (D) can be copied to an SD card to back up the instrument. After restoring this data to the instrument, you may go on operation without entering any data.


During the backup operation, setup (parameter groups 1,2 and 3) and calibration (parameter group 5) parameters are copied into the SD card.

There are three choices for restoring: Restoring all the data, only setup data, or only calibration data. Restoring the calibration data, the previous one gets lost. This feature is commonly used for loading set-up, calibration data to the new FT-112 (D). The scale can be recalibrated after restoring the data if need be.

### Back up

1. Insert a FAT32 formatted SD card with 16Gb max. and into the SD card slot
2. Enter the programming mode, select the **parameter 961** and then press  key (Refer to Section 6).

### Restore

1. Insert the SD card having the backup of all the data into the SD card slot
2. Enter the programming mode and go to **parameter 962**.
3. Select All or set-up or calibration and then press  key (Refer to Section 6).

## 5.4 Setup, Backup and Restore via Indface2x Software

Set-up and programming of FT-112 (D) can be done via IndFace2X PC software.

1. Download free IndFace2X software from Flintec web page and install it into your PC,
2. Connect FT-112 (D) to the PC via USB port, RS232C port or Ethernet port.
3. Set port parameters of software to indicator parameters after energizing the instrument.
4. Click connect button.
5. Please refer to Indface2x software document for further information.

## 5.5 Firmware Upgrade

For the firmware upgrade you need a PC with Windows 10 operating system and a micro-USB cable. Please refer to FT-11x Weighing Terminal Firmware Update document to load the new firmware.

## 5.6 Copying the weighing-related data from SD card to a PC

FT-112 (D) has data logging feature that can record all weighing-related data to the SD card. This data can be transferred to a PC, as explained below.

1. Prepare a PC with a terminal program such as Hyperterminal.
2. PC to FT-112 (D) connection can be done in two ways.
  - a. Direct connection via RS232/485/Ethernet/USB
  - b. Via local area network. If PC and FT-112 (D) are connected to the same local area this connection can be made. After Ethernet connection enter the IP number of FT-112 (D) to the terminal program.
3. Select the data format of the port connected to FT-112 (D) as BSI and make other necessary communication settings for the port accordingly.
4. Send BSI command "L" via terminal program to transfer data from SD card to PC.
5. After sending "L" command, the data in the SD card is copied to the PC. Save data to PC when copying is finished.


6. After saving the data, send the "E" BSI command to delete the data in the SD card.

## 5.7 Alibi memory

*RELATED PARAMETERS: Main block 8--.*

Mandatory weighing data recording with paperless alibi memory in certified operation. The weighing data is saved in the alibi memory after every weighing operation together with date and time. The alibi record number may also be found on the printout data.




After the following actions the data is recorded in the alibi memory:

1. Press  key to print the label,
2. Automatic printing (automatic print data transfer),
3. Interface command ASCII < P > ,
4. BSI commands request the stable weight,
5. Print commands on fieldbus interfaces,
6. Digital < Print > input.

The alibi memory recording works in a FIFO loop memory principle which deletes the oldest record after the capacity limit of 99 999 has been reached and overwrites the latest weighing. Quick access to the record of specific weighing is provided by entering the suitable search criteria.

To access the alibi record menu enter the "Metrology main block" in the programming menu. Refer to **page 68**. Then select one of the suitable criteria: Alibi number, date, net weight, gross weight or tare weight. You may also transfer all alibi memory records to your PC.

### Access to Alibi records:







1. Go to the parameter [ 8-- METROLOGY] main block in set up.
2. Press  key twice and  key to access **parameter 812**.
3. Select the suitable criteria by pressing  key which are NUM (Alibi number), DATE (weighing date), NET (net weight), GROS (gross weight), TARE (tare weight) or CONS (consecutive number)

Alibi records appear sequentially on the display:







The alibi record of the selected weighing is displayed in the sequence below.

1. Alibi number
2. Date
3. Time
4. Gross weight
5. Net weight
6. Tare weight
7. Consecutive number





### Fast search with Alibi number:

1. Press  key after selecting NUM in **parameter 812**
2. Press numeric keys to enter alibi number in the printout data and press  key. You may navigate in the alibi memory with  or  keys after entering alibi number
3. The weighing data in the alibi memory is indicated on the display
4. Press  key to print this record and the previous nine weighings
5. Press  key 4 times to return to normal operation






### Fast search with date:

1. Press  key after selecting DATE in **parameter 812**.
2. Press numeric keys to enter date in the printout data and press  key. The date format entry should be as per the operation, e.g. date entry should be DDMMYY if **parameter 251** has been set to DMY. Navigate in the alibi memory with  or  keys after entering alibi number
3. The weighing data in the alibi memory is indicated on the display
4. Press  key to print this record and the previous nine weighings
5. Press  key 4 times to return to normal operation




### Fast search with weight value:

1. Press  key after selecting NET, gross or tare which is suitable in **parameter 812**
2. Press numeric keys to enter weight value in the printout data and press  key.
3. The alibi record is indicated on the display
4. Press  key to print this record and the previous nine weighings
5. Press  key 4 times to return to normal operation

### Transfer all Alibi records:







1. Go to the parameter [ 8-- METROLOGY ] main block in set up.
2. Press  key twice and  key twice to access **parameter 813**.
3. Press  key to select PRNT and press  key to start transferring.
4. Or you may stop transferring by pressing  key.

### About Alibi Memory:

1. Go to the parameter [ 8-- METROLOGY ] main block in set up
2. Press  key twice and  key 3 times to access **parameter 814**
3. Press  key to print alibi information

### Format Alibi Memory:






Alibi memory may need to be formatted after installing the used SD card into another instrument, to erase previous records. This process requires the calibration switch to be in the programming position. Alibi memory formatting should only be done by an authorized person. **Erasing the alibi memory may result in undesired legal consequences.**

1. Go to the parameter [ 8-- METROLOGY ] main block in set up.
2. Press  key 2 times and  key 4 times to access **parameter 815**.
3. Select YES and press  key.
4. The warning prompt [ ARE YOU SURE? ] appears on the display.
5. Press  key to start formatting or press  key to escape.
6. Press  key 3 times to return operation.

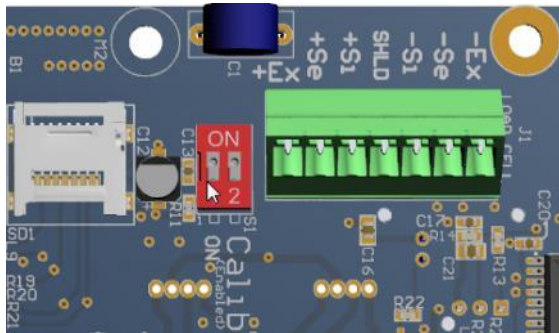
The empty fields are indicated as [ ----- ] and transferred as [ NO RECORD ]; The corrupted records are indicated as [ Error ] and transferred as [ CORRUPTED ].

## 6 PROGRAMMING AND CALIBRATION

The programming and calibration procedure of FT-112 weighing terminal is contained in this section. The arrows on the lower right corner of the code keys under the display indicate the function of the keys in programming menu. The basic meaning of these keys is

				
Return	Decrease or previous step.	Increase or next step.	Change the item or enter parameter.	Confirm the alphanumeric entry and go to the next step

A set-up DIP switch is located as shown in the figure below and its position should be "ON" to change the metrological related parameters including calibration.



DIP Switch	Description
1	Calib SW
2	Reserve

Figure 6.1- The location of calibration DIP switch

### 6.1 Passwords




*RELATED PARAMETERS: Sub-block 26- .*

#### 6.1.1 Keylock




FT-112 has the ability to lock the keys to avoid unauthorized scale use. The key(s) which need to be locked can be programmed in the setup at sub-block 34- and the **parameter 261**.

Key lock password default is 11.

##### Lock the key



1. Press  key for more than 2 seconds. [LOCK PASSWORD:] prompt appears on the display.
2. Enter the key lock password. Refer to **parameter 261**.
3. Press  key.  symbol appears on the display.

##### Unlock the key

1. Press  key for more than 2 seconds. [LOCK PASSWORD:] prompt appears on the display.
2. Enter the key lock password.
3. Press  key.  symbol disappears on the display.

## 6.1.2 User password

This password is used to setup the legally non-related parameters for your application.  
The default **password** is 1111.



Display	Operation
[123.456 kg]	Press  key until [ <b>PASSWORD :</b> ] is displayed.
[PASSWORD]	Enter "1111"
[PASSWORD ****]	Press  key.
[1—INTERFACE ]	You entered the programming main menu and the first main block [1—INTERFACE ] prompt appears.

## 6.1.3 Service password

This password is only used to access the instrument by trained technical persons.  
The default **password** is 1111.

## 6.2 Entering the Programming and Calibration





To enter the programming menu, follow the description in the table below. Legally related parameters can only be changed if the calibration dip switch is at ON position. These parameters are marked with **M** symbol in the parameter table in this section. Before changing any legally related parameter or perform calibration, set the calibration switch to the ON position before entering the programming.

Display	Operation
[123.456 kg]	Press  key until [ <b>PASSWORD :</b> ] prompt appears
[PASSWORD]	Enter your 4 digit passport by pressing keys sequentially. (Default is 1111)
[**** ]	Press  key.
[1—INTERFACE ]	You entered to the programming main menu and the first main block [1—INTERFACE ] prompt appears.











## 6.3 Fast Access to the Frequently used Parameter Blocks

The instrument has a fast access feature to frequently adjusted parameters for easy use or service. As described in the previous section, pressing the keys below for more than 2 seconds at main block [1—INTERFACE ], will allow fast access to the parameter blocks.

Fast access key	Function
	Press this key to access the fieldbus parameters (Sub-block [ 19- ]).
	Press this key to access the calibration [621].
	Press this key to access application parameters (Sub-block [ 31- ]).
	Press this key to access the service parameters.

## 6.4 Exiting the Programming and Calibration

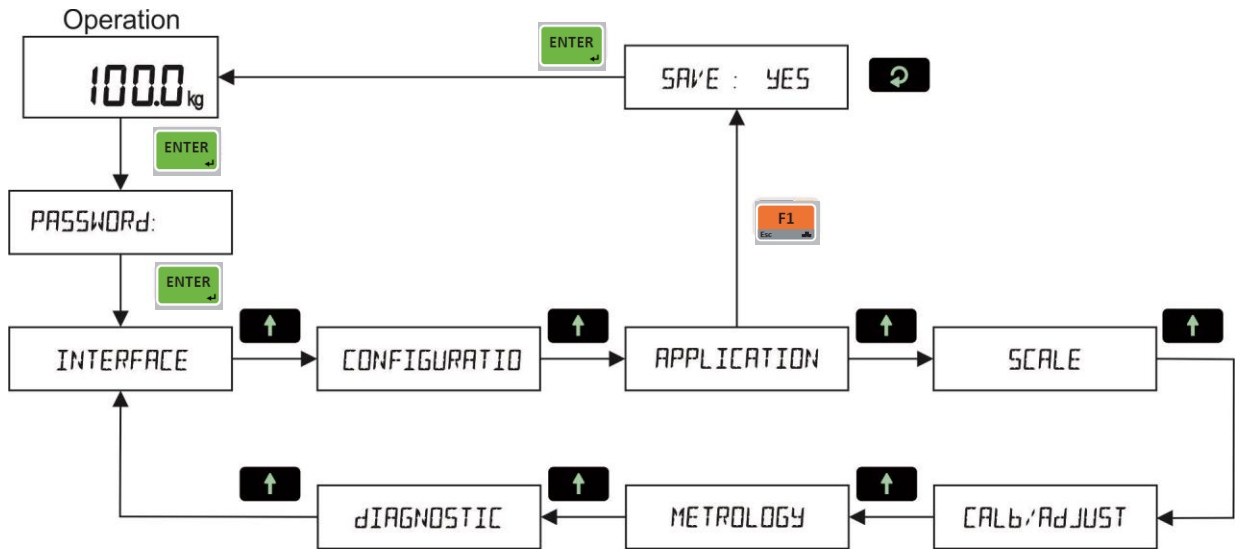
1. Press  key until [SAVE: YES] prompt appears on the display.
2. Press  key to save the changes into the memory or
3. Press  key to change item to [SAVE: NO], press  key to leave the programming without saving the changes or
4. Press  key to change item to [SAVE: BACK], press  key to return to menu or
5. Press  key to change item to [SAVE: TEMP], press  key to store the changes until the instrument is powered off.

[ WAIT ] message will be shown on the display for a short while and the weighing indicator goes back to the weighing mode.

**WARNING:** Don't forget to switch off the instrument and change the calibration DIP switch position to "OFF" before using your scale for trade.

## 6.5 Programming and Parameters

FT-112 weighing terminal is programmed in seven main blocks. These are serial interface, configuration, application, scale, calibration, metrology and service.














The main blocks in the programming menu are displayed as [1-- INTERFACE ] and sub-blocks are displayed as [11- RS232C-1 ]. Parameters are located in the sub-blocks as [111 FORMAT: CONT ].







You can move in the blocks by pressing or keys. After reaching the desired block, press key or key to enter it. After reaching the required parameter, you may change its function by pressing key. A value can be entered in the parameter by pressing numeric keys, then pressing , or keys to go to the following parameter.







For example, to change the Baud rate of RS485 serial interface to 57600;







1. After entering the programming, the [1-- INTERFACE ] sub-block prompt appears. Press .
2. [11- RS232C-1 ] prompt appears. Press key until [13- RS485 ] appears and press .
3. [131 FORMAT: NO ] prompt appears. Press key until [132 BAUD: 9600 ] appears.
4. Press key until [132 BAUD: 57K6 ] prompt appears.
5. Press key to go to the following parameter.







Legally related parameters can be changed if the calibration dip switch is at ON position. The values of these parameters are limited accordingly to the OIML against incorrect set up. Legal for trade related parameters are marked with **M** symbol in the table below.




<p>[ 1-- INTERFACE ]</p>	<p><b>INTERFACE MAIN BLOCK</b>                  Press  key sequentially to access this main block,                  or press  or  key to enter configuration parameters,                  or press  key to go to the next block,                  or press  key to exit from programming.</p>		
<p>[ 11- RS232C-1 ]</p>	<p><b>1st RS 232C SERIAL PORT (Int 1)</b>                  Press  key or  key again to enter this menu.                  Or press  key to go to the next sub-block.</p>		
<p>[ 111 FORMAT : PRNT ]</p>	<p>Data format of the serial port                  NO : Port is disabled                  CONT : Continuous data output                  FAST : High speed continuous data output                  PRNT : Printout                  BSI : BSI format for PC, PLC interface                  BARC : Bar code reader, ID device                  MBHL : Modbus RTU High-Low format                  MBLH : Modbus RTU Low-High format</p>		<p><i>Page 107, 22</i></p>
	<p>Press  key to select output format different from Flintec continuous data format while the selection is CONT in the information display. Available functions are shown on the weight display after pressing  key sequentially. Press  key after selecting the data format.                  Refer to Chapter 13.1 for details data structure.</p>		
	<p>Flintec HBM  Toledo  Systec SMA  Baster Rinstr  AVERY Sartor LM2 LLINE2</p>	<p>: Flintec continuous format.                  : Commonly used by HBM, GSE, PT,                  : Systec, Rinstrum.                  : Commonly used by Toledo, Mettler                  : Toledo.                  : Commonly used by Systec.                  : Commonly used by USA producers,                  : Cardinal, Rice Lake etc.                  : Commonly used by Baster.                  : Commonly used by PT, Rinstrum, HBM,                  : GSE.                  : Commonly used by Avery E1205.                  : Commonly used by Sartorius.                  : Flintec LM2 ( BX1 par.000=6 )                  : Commonly used by Tunaylar.</p>	
<p>[ 112 BAUD : 9600 ]</p>	<p>Baud rate                  1200 : 1200                      19K2 :                      19200                  2400 : 2400                      38K4 :                      38400                  4800 : 4800                      57K6 :                      57600                  9600 : 9600</p>		
<p>[ 113 LENGHT : 8 ]</p>	<p>Data Length                  7 : 7 bits                  8 : 8 bits</p>		
<p>[ 114 PARITY : NO ]</p>	<p>Parity</p>		

		NO : No parity ODD : Odd parity EVEN : Even parity
[ 115	CSUM : NO ]	Checksum at continuous and BSI formats. NO : Checksum disable YES : Checksum enable
[ 116	CR : NO ]	Carriage return at continuous formats. NO : Carriage return disable YES : Carriage return enable
[ 117	LFEED : YES ]	Line feed NO : Line feed disable YES : Line feed enable
[ 118	DELAY : 50 ]	Data output delay at demand formats; delay between continuous format data. 000 .... 999 milisecond.
[ 119	ADDRESS : 00 ]	Address of the port 00 .... 99. 00 means data format without address.
[ 12-	RS232C-2 ]	<b>2nd RS 232C SERIAL PORT (Int 2)</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 121	FORMAT : NO ]	Data format of the serial port NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface BARC : Bar code reader, ID device MBHL : Modbus RTU High-Low format MBLH : Modbus RTU Low-High format
		Press  key to select an output format different from Flintec continuous data format while the selection is CONT in the information display. Available functions are shown on the weight display after pressing  key sequentially. Press  key after selecting the data format. Refer to Chapter 13.1 for details data structure.
		Flintec : Flintec continuous format. HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum. Toledo : Commonly used by Toledo, Mettler Toledo. Systec : Commonly used by Systec. SMA : Commonly used by USA producers, Cardinal, Rice Lake etc. Baster : Commonly used by Baster. Rinstr : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. Sartor : Commonly used by Sartorius. LM2 : Flintec LM2 ( BX1 par.000=6 ) LLINE2 : Commonly used by Tunaylar.

[ 122 BAUD : 9600 ]	Baud rate 1200 : 1200                    19K2 :            19200 2400 : 2400                    38K4 :            38400 4800 : 4800                    57K6 :            57600 9600 : 9600
[ 123 LENGHT : 8 ]	Data Length 7 : 7 bits 8 : 8 bits
[ 124 PARITY : NO ]	Parity NO : No parity ODD : Odd parity EVEN : Even parity
[ 125 CSUM : NO ]	Checksum at continuous and BSI formats. NO : Checksum disable YES : Checksum enable
[ 126 CR : NO ]	Carriage return at continuous formats. NO : Carriage return disable YES : Carriage return enable
[ 127 LFEED : YES ]	Line feed at continuous formats. NO : Line feed disable YES : Line feed enable
[ 128 DELAY : 50 ]	Data output delay at demand formats; delay between continuous format data.  000 .... 999 milisecond.
[ 129 ADDRESS : 00 ]	Address of the port  00 .... 99. 00 means data format without address.
[ 13- RS485 ]	<b>RS 485 SERIAL PORT (Int 3)</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 131 FORMAT : NO ]	Data format of the serial port NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface BARC : Bar code reader, ID device MBHL : Modbus RTU High-Low format MBLH : Modbus RTU Low-High format
	Press  key to select an output format different from Flintec continuous data format while the selection is CONT in the information display. Available functions are shown on the weight display after pressing  key sequentially. Press  key after selecting the data format.  Refer to Chapter 13.1 for details data structure.









	<p>Flintec : Flintec continuous format.  HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  Toledo : Commonly used by Toledo, Mettler Toledo.  Systec : Commonly used by Systec.  SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.  Baster : Commonly used by Baster.  Rinstr : Commonly used by PT, Rinstrum, HBM, GSE.  AVERY : Commonly used by Avery E1205.  Sartor : Commonly used by Sartorius.  LM2 : Flintec LM2 ( BX1 par.000=6 )  LLINE2 : Commonly used by Tunaylar.</p>												
[ 132 BAUD : 9600 ]	<p>Baud rate</p> <table> <tr> <td>1200 : 1200</td> <td>19K2 :</td> <td>19200</td> </tr> <tr> <td>2400 : 2400</td> <td>38K4 :</td> <td>38400</td> </tr> <tr> <td>4800 : 4800</td> <td>57K6 :</td> <td>57600</td> </tr> <tr> <td>9600 : 9600</td> <td></td> <td></td> </tr> </table>	1200 : 1200	19K2 :	19200	2400 : 2400	38K4 :	38400	4800 : 4800	57K6 :	57600	9600 : 9600		
1200 : 1200	19K2 :	19200											
2400 : 2400	38K4 :	38400											
4800 : 4800	57K6 :	57600											
9600 : 9600													
[ 133 LENGHT : 8 ]	<p>Data Length</p> <p>7 : 7 bits  8 : 8 bits</p>												
[ 134 PARITY : NO ]	<p>Parity</p> <p>NO : No parity  ODD : Odd parity  EVEN : Even parity</p>												
[ 135 CSUM : NO ]	<p>Checksum at continuous and BSI formats.</p> <p>NO : Checksum disable  YES : Checksum enable</p>												
[ 136 CR : NO ]	<p>Carriage return at continuous formats.</p> <p>NO : Carriage return disable  YES : Carriage return enable</p>												
[ 137 LFEEED : YES ]	<p>Line feed at continuous formats.</p> <p>NO : Line feed disable  YES : Line feed enable</p>												
[ 138 DELAY : 20 ]	<p>Data output delay at demand formats; delay between continuous format data.</p> <p>000 .... 999 milisecond.</p>												
[ 139 ADDRESS : 01 ]	<p>Address of the port</p> <p>00 .... 99.  00 means data format without address.</p>												
[ 14- USB ]	<p><b>USB</b></p> <p>Press  key or  key again to enter this menu.  Or press  key to go to the next sub-block.</p>												
[ 141 FORMAT : NO ]	<p>Data format of the USB port <span style="float: right;"><i>Page 107, 26</i></span></p> <p>NO : Port is disabled  CONT : Continuous data output  FAST : High speed continuous data output  BSI : BSI format for PC, PLC interface</p>												
	<p>Press  key to select an output format different from Flintec continuous data format while the selection is CONT in the information display. Available functions are shown on the weight display after pressing  key sequentially. Press  key after selecting the data format.</p>												


















	Refer to Chapter 13.1 for details data structure.
	<p>Flintec : Flintec continuous format.  HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  Toledo : Commonly used by Toledo, Mettler Toledo.  Systec : Commonly used by Systec.  SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.  Baster : Commonly used by Baster.  Rinstr : Commonly used by PT, Rinstrum, HBM, GSE.  AVERY : Commonly used by Avery E1205.  Sartor : Commonly used by Sartorius.  LM2 : Flintec LM2 ( BX1 par.000=6 )  LLINE2 : Commonly used by Tunaylar.</p>
[ 142 CSUM : NO ]	<p>Checksum at continuous and BSI formats.  NO : Checksum disable  YES : Checksum enable</p>
[ 143 CR : NO ]	<p>Carriage return at continuous formats.  NO : Carriage return disable  YES : Carriage return enable</p>
[ 144 LFEED : YES ]	<p>Line feed at continuous formats.  NO : Line feed disable  YES : Line feed enable</p>
[ 145 DELAY : 50 ]	<p>Data output delay at demand formats: delay between continuous format data.  000 .... 999 milisecond.</p>
[ 15- ETHERNET ]	<p><b>ETHERNET TCP/IP</b>  Press  key or  key again to enter this menu.  Or press  key to go to the next sub-block.</p>
[ 151 FORMAT : NO ]	<p>Data format of the Ethernet port <span style="float: right;"><i>Page</i> 107, 24</span>  NO : Port is disabled  CONT : Continuous data output  FAST : High speed continuous data output  PRNT : Printout  BSI : BSI format for PC, PLC interface  BARC : Bar code reader.  MBHL : Modbus TCP High-Low format  MBLH : Modbus TCP Low-High format</p>
	<p>Press  key to select an output format different from Flintec continuous data format while the selection is CONT in the information display. Available functions are shown on the weight display after pressing  key sequentially. Press  key after selecting the data format.</p> <p>Refer to Chapter 13.1 for details data structure.</p>
	<p>Flintec : Flintec continuous format.  HBM : Commonly used by HBM, GSE, PT, Systec, Rinstrum.  Toledo : Commonly used by Toledo, Mettler Toledo.  Systec : Commonly used by Systec.  SMA : Commonly used by USA producers, Cardinal, Rice Lake etc.  Baster : Commonly used by Baster.  Rinstr : Commonly used by PT, Rinstrum, HBM, GSE.  AVERY : Commonly used by Avery E1205.  Sartor : Commonly used by Sartorius.</p>









	LM2 : Flintec LM2 ( BX1 par.000=6 ) LLINE2 : Commonly used by Tunaylar.
[ 152 IP : 250 ]	IP address. Default is 192.168.016.250
[ 153 ADDRESS : 00 ]	Address of the port 00 .... 255. 00 means data format without address.
[ 154 SUBMASK : 000 ]	Subnet mask address. Default is 255.255.255.000
[ 155 GATEWAY : 253 ]	Gateway address. Default is 192.168.016.253
[ 156 LOCAL P1 : 502 ]	Local port 1. 000 .... 65535
[ 157 LOCAL P2 : 503 ]	Local port 2. 000 .... 65535
[ 158 LOCAL P3 : 504 ]	Local port 3. 000 .... 65535
[ 159 DNS : 254 ]	DNS address. Default is 208.067.222.222
[ 15A MAC ADR : ]	MAC address. AA:BB:CC:DD:EE:FF
[ 15B TIMEOUT : 5 ]	Inactivity time out. 00 .... 60 sec.
[ 15C CR-LF : NO ]	Carriage return and Line feed at continuous formats. NO : Carriage return disable YES : Carriage return enable
[ 15D DELAY : 010 ]	Data output delay at demand formats; delay between continuous format data. 000 .... 999 milisecond.
[ 15E REMOTEIP : 000 ]	Remote IP address. Default is 0.0.0.0
[ 15F REMOTEPO : 0000 ]	Remote port. 000 .... 65535
[ 16- PRINTER ]	<b>PRINTER</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 161 FORMAT : 26F2 ]	Data format of the printout <i>Page 107</i> SING : Single line 16F1 : Multiline Format 1 for 16 Character printer 16F2 : Multiline Format 2 for 16 Character printer 26F1 : Multiline Format 1 for 26 Character printer 26F2 : Multiline Format 2 for 26 Character printer EPL : EPL Format
[ 162 METHOD : KEY ]	Printing method


























	<p>KEY : Printing with key</p> <p>LOCK : Print interlock. Only one time printout after loading if weight change is more than 10 divisions.</p> <p>AUTO : Auto print, if the gross load is larger than MIN WEIGHT and stable. Unload and load the scale for the next print.</p> <p>LOAD : Autoprint if W&gt;MIN WEIGHT and weight change is more than 10d.</p> <p>DAUT : Auto print for Dynamic operation. if the dynamic result is bigger than MIN WEIGHT. Unload and load the scale for next print.</p>
[ 163 PRT MSG : NO ]	<p>Display " PRINT" message at printout</p> <p>NO : Disable</p> <p>YES : Enable</p>
[ 164 CN : YES ]	<p>Ticket number on printout.</p> <p>NO : Disable</p> <p>YES : Enable</p>
[ 165 DATE : YES ]	<p>Date printing on printout.</p> <p>NO : Disable</p> <p>YES : Enable</p>
[ 166 TIME : YES ]	<p>Time printing on printout.</p> <p>NO : Disable</p> <p>YES : Enable</p>
[ 167 ID1 : N+D ]	<p>ID1 printing on printout.</p> <p>NO : Disable</p> <p>DATA : Print ID1 data</p> <p>N+D : Print ID1 name and data</p>
[ 168 ID2 : N+D ]	<p>ID2 printing on printout.</p> <p>NO : Disable</p> <p>DATA : Print ID2 data</p> <p>N+D : Print ID2 name and data</p>
[ 169 S.NAME : NO ]	<p>Scale name printing on printout.</p> <p>NO : Disable</p> <p>YES : Enable</p>
[ 16A STATIST : NO ]	<p>Statistical results print with totalization printout.</p> <p>NO : Disable</p> <p>YES : Enable</p>




[ 17- LABEL SETUP ]	<b>LABEL SETUP</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 171 HEADER1 : ]	Header of printout, the first line. <span style="float: right;"><i>Page 109</i></span> Maximum 20 character.
[ 172 HEADER2 : ]	Header of printout, the second line. <span style="float: right;"><i>Page 109</i></span> Maximum 20 character.
[ 173 HEADER3 : ]	Header of printout, the third line. <span style="float: right;"><i>Page 109</i></span> Maximum 20 character.
[ 174 FOOTER1 : ]	Footer of printout, the first line. <span style="float: right;"><i>Page 109</i></span> Maximum 20 character.
[ 175 FOOTER2 : ]	Footer of printout, the second line. <span style="float: right;"><i>Page 109</i></span> Maximum 20 character.
[ 176 LF BEFO : +2 ]	Line feed before printout ( Press  key to change ) : + = Forward , - = Backward : 0,1,2....9 : Line feed qty before data.  Example: +2 means 2 line feed forward.
[ 177 LF AFTE : +4 ]	Line feed after printout ( Press  key to change ) : + = Forward , - = Backward : 0,1,2....9 : Line feed qty after data.  Example: -2 means 2 line feed backward.
[ 178 FORM FE : NO ]	Form feed. NO : Disable YES : Enable
[ 179 LEFT SP : 3 ]	Space from left of the label. 0...9
[ 17A COPY : 1 ]	Copy quantity. 1..9
[ 18- BAR C-ID DEV ]	<b>ID DEVICE</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 181 STX : NO ]	STX in the front of the received data <span style="float: right;"><i>Page 34</i></span> NO : There is no STX in front of the data string. YES : There is STX in front of the data string.
[ 182 PREFIX : 00 ]	Prefix. Enter character quantity which follow after STX and will not be saved.
[ 183 LENGTH : 32 ]	Data length. The identification data or specific tare length which is located after stx and prefix in the string.
[ 184 AUTOSAVE : NO ]	Automatic save the data




	<p>NO : Enter key pressing is required to save the data after receiving it from ID device.</p> <p>YES : The data receiving from ID device is automatically saved.</p>
[ 19- ANALOG OUT ]	<p><b>ANALOGUE OUTPUT</b> (Appears if the option is installed)</p> <p>Press  key or  key again to enter this menu.</p> <p>Or press  key to go to the next sub-block.</p>
[ 191 TYPE : 4-20 ]	<p>Analog output type</p> <p>4-20 : 4 mA - 20 mA  0-20 : 0 mA - 20 mA  0-10 : 0 VDC- 10 VDC  0-5 : 0 VDC- 5 VDC</p>
[ 192 MINIMUM : 00.0 ]	<p>The minimum of the analogue output. Default 00.0 means the minimum output is not drifting.  e.g. enter 1.0 to set output to 1.0 volt at 0 kg in 0 -10 V range.</p>
[ 193 MAXIMUM : 00.0 ]	<p>The maximum of the analogue output. 00.0 means the maximum output is not drifting.  e.g. enter 9.0 to set output to 9.0 volt at Max load in 0 -10 V range.</p>
[ 194 SOURCE : GROS ]	<p>Source of the analogue output</p> <p>GROS : Gross weight  INDI : Indicated weight</p>
[ 195 ZERO ADJ : ]	<p>Displays the count value of unloaded scale.</p> <p>Increase or decrease by pressing  or ; or enter the value by pressing numeric keys to change the unloaded scale output.</p>
[ 196 SPAN ADJ : ]	<p>Displays the count value of loaded scale to the Max.</p> <p>Increase or decrease by pressing  or ; or enter the value by pressing numeric keys to change the analogue output gain.</p> <p> and  keys can be used for faster change</p>
[ 197 AUTO ADJ : NO ]	<p>Set analogue output to calibration range</p> <p>NO : No  YES : Automatic adjustment between min and max limits if changed.</p>
[ 19- PROFIBUS ]	<p><b>PROFIBUS CONFIGURATION</b> (Appears if the option is installed)</p> <p>Press  key or  key again to enter this menu.</p> <p>Press  key to go to the sub-block 11- or press  key to go to the next sub-block.</p>
[ 191 FORMAT : INTG ]	<p>Data format of the Profibus</p> <p>INTG : Signed 32 bit integer, no decimal point implied.  FLOA : 32 bit float, decimal point implied.</p>
[ 192 ADDRESS : 001 ]	<p>Node address  001...125</p>
[ 19- PROFINET ]	<p><b>PROFINET CONFIGURATION</b> (Appears if the option is installed)</p> <p>Press  key or  key again to enter this menu.</p> <p>Press  key to go to the sub-block 11- or press  key to go to the next sub-block.</p>
[ 191 FORMAT : INTG ]	<p>Data format of the Profinet</p>

	<p>INTG : Signed 32 bit integer, no decimal point implied.</p> <p>FLOA : 32 bit float, decimal point implied.</p>
[ 192 IP : 250 ]	<p>IP address of Ethernet port. Default is 192.168.16.250</p>
[ 194 SUB MASK : 000 ]	<p>Subnet mask address of Ethernet port. Default is 255.255.255.000</p>
[ 195 GATEWAY : 253 ]	<p>Gateway address. Default is 192.168.16.253</p>
[ 196 S. NAME : SCAL ]	<p>Station (device) name. Default is SCALE-1</p>
[ 19A MAC ADR : ]	<p>MAC address AA:BB:CC:DD:EE:FF</p>
[ 19- CANOPEN ]	<p><b>CANOPEN CONFIGURATION</b> (Appears if the option is installed)</p> <p>Press  key or  key again to enter this menu. Press  key to go to the sub-block 11- or press  key to go to the next sub-block.</p>
[ 191 FORMAT : INTG ]	<p>Data format of the CANopen</p> <p>INTG : Signed 32 bit integer, no decimal point implied.</p> <p>FLOA : 32 bit float, decimal point implied.</p>
[ 192 ADDRESS : 001 ]	<p>Node address 001...127</p>
[ 19- ETHERNET IP ]	<p><b>ETHERNET/IP CONFIGURATION</b> (Appears if the option is installed)</p> <p>Press  key or  key again to enter this menu. Press  key to go to the sub-block 11- or press  key to go to the next sub-block.</p>
[ 191 FORMAT : INTG ]	<p>Data format of the EtherNet/IP</p> <p>INTG : Signed 32 bit integer, no decimal point implied.</p> <p>FLOA : 32 bit float, decimal point implied.</p>
[ 192 IP : 250 ]	<p>IP address of Ethernet port. Default is 192.168.16.250</p>
[ 194 SUB MASK : 000 ]	<p>Subnet mask address of Ethernet port. Default is 255.255.255.000</p>
[ 195 GATEWAY : 253 ]	<p>Gateway address. Default is 192.168.16.253</p>
[ 19A MAC ADR : ]	<p>MAC address AA:BB:CC:DD:EE:FF</p>








[ 19- ETHERCAT ]	<b>ETHERCAT CONFIGURATION</b> (Appears if the option is installed) Press  key or  key again to enter this menu. Press  key to go to the sub-block 11- or press  key to go to the next sub-block.
[ 191 FORMAT : INTG ]	Data format of the EtherCAT INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[ 19- CC-LINK ]	<b>CC-LINK CONFIGURATION</b> (Appears if the option is installed) Press  key or  key again to enter this menu. Press  key to go to the sub-block 11- or press  key to go to the next sub-block.
[ 191 FORMAT : INTG ]	Data format of the CC-Link INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[ 192 ADDRESS : 001 ]	Node address 001...64
[ 193 BAUD : 156K ]	Baud rate 156K : 156 kbps 625K : 625 kbps 2.5M : 2.5 Mbps 5M : 5 Mbps 10M : 10 Mbps
[ 19- POWERLINK ]	<b>POWERLINK CONFIGURATION</b> (Appears if the option is installed) Press  key or  key again to enter this menu. Press  key to go to the sub-block 11- or press  key to go to the next sub-block.
[ 191 FORMAT : INTG ]	Data format of the Powerlink INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[ 192 ADDRESS : 001 ]	Node address 001...239

[ 2-- CONFIGURATIO ]	<p><b>CONFIGURATION MAIN BLOCK</b></p> <p>Press  key sequentially to access this main block,  or press  or  key to enter configuration parameters,  or press  key to go to the next block,  or press  key to exit from programming.</p>
[ 21- DSPLY ACUSTI ]	<p><b>DISPLAY AND ACOUSTIC</b></p> <p>Press  key or  key again to enter this menu.  Or press  key to go to the next sub-block.</p>
[ 211 LIGHT : ON ]	<p>Backlight</p> <p>OFF : Backlight disabled.  ON : Always bright.  AUTO : Automatic backlight to increase the battery life.</p>
[ 212 COLOR : TURQ ]	<p>Backlight color at basic weighing</p> <p>WHIT : White  LGRE : Light Green  GREE : Green  TURQ : Turquoise  BLUE : Blue  YELL : Yellow  AMBE : Amber  RED : Red</p>
[ 213 KEYSOUN : YES ]	<p>Key sound</p> <p>NO : Disable  YES : Enable</p>
[ 214 REFRESH : 5 ]	<p>Display refresh rate</p> <p>X : 1..9 times/sec</p>
[ 22- INFO DISPLAY ]	<p><b>INFORMATION DISPLAY</b></p> <p>Press  key or  key again to enter this menu.  Or press  key to go to the next sub-block.</p>
[ 221 TIME : D+T ]	<p>Information data on right of the alphanumeric display.</p> <p>NO : No clock data on the display.  T : Display time,  D : Display date,  D+T : Display date and time,</p>
[ 222 DATA : TARE ]	<p>Information data on the left of the alphanumeric display.</p> <p>NO : No data  TARE : Tare weight is displayed  GROS : Gross weight is displayed in Net  ID1 : ID1 Data  ID2 : ID2 Data  TOTA : Total  Q+TO : Quantity and total  GTOT : Grand Total  APW : Active APW value.  NAME : Active APW value, Scale name</p> <p><i>Note: The par 221 is set to NO, if this parameter isn't programmed NO, TARE or GROSS.</i></p>









[ 23- START UP ]	<b>START UP</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 231 TARING : MULT ]	Taring. <span style="float: right;"><i>Page 29</i></span> NO : Disabled. MULT : Tare with key, via serial interface or via digital input. GROS : Tare with key, via serial interface or via digital input only at gross. PT : Preset tare and tare with key or via serial interface. PT-G : Preset tare and tare with key or via serial interface at gross.
[ 232 AUTO T : NO ]	Auto taring. <span style="float: right;"><i>Page 29</i></span> NO : Disabled. YES : Auto tare, if the gross load is bigger than MIN TARE and stable.
[ 233 AUTO CLR : NO ]	Auto clear. <span style="float: right;"><i>Page 29</i></span> NO : Disabled. YES : Auto clear, if the gross load is lower than 10d.
[ 234 PWR TARE : NO ]	Restore Tare at power on NO : Disabled. YES : Tare value is saved with power off and the indication is started in NET after switch on of the instrument.
[ 235 FILTER : MEDI ]	Adaptive digital filter. NO : Disable. Fastest weighing; but the most sensitive to envorimental vibrations. VLOW : Very low filtering LOW : Low filter MEDI : Medium filter HIGH : High filter VHIG : Very high filter. Slowest and the most stable weighing.
[ 236 LANGUAGE : ENG ]	Language. ENG : English DEU : Deutsch FRA : Français ITA : Italiano ESP : Espagnol TUR : Türkçe







[ 24- KEYS FUNCTION ]	PROGRAMMING OF KEY FUNCTIONS Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 241 "F1" KEY : HIGH ]	<p>The function of <b>F1</b> key</p> <ul style="list-style-type: none"> <li>NO : Disable</li> <li>COUN : Count with pieces</li> <li>ID2 : ID2 key</li> <li>HIGH : High resolution</li> <li>SET : Setpoint/ SmartAPP limit value entry</li> <li>SMRT : Start / Stop SmartAPP</li> <li>PT : Preset Tare key</li> <li>G/N : Temp. Gross in Net</li> <li>GTOT : Grand total</li> <li>RPRN : Reprint</li> <li>DYNA : Dynamic weighing start</li> <li>SCL : Scale change</li> <li>UNIT : Unit change (only FT-112)</li> </ul>
[ 242 "F2" KEY : G/N ]	<p>The function of <b>F2</b> key</p> <ul style="list-style-type: none"> <li>NO : Disable</li> <li>APW : Count with APW</li> <li>ID2 : ID2 key</li> <li>HIGH : High resolution</li> <li>SET : Setpoint/ SmartAPP limit value entry</li> <li>SMRT : Start / Stop SmartAPP</li> <li>PT : Preset Tare key</li> <li>G/N : Temp. Gross in Net</li> <li>GTOT : Grand total</li> <li>RPRN : Reprint</li> <li>DYNA : Dynamic weighing start</li> <li>SCL : Scale change</li> <li>UNIT : Unit change (only FT-112)</li> </ul>
[ 243 ID2 KEY : ID2 ]	<p>The function of <b>ID2</b> key</p> <ul style="list-style-type: none"> <li>NO : Disable</li> <li>COUN : Count with pieces</li> <li>ID2 : ID2 key</li> <li>HIGH : High resolution</li> <li>SET : Setpoint/ SmartAPP limit value entry</li> <li>SMRT : Start / Stop SmartAPP</li> <li>PT : Preset Tare key</li> <li>G/N : Temp. Gross in Net</li> <li>GTOT : Grand total</li> <li>RPRN : Reprint</li> <li>DYNA : Dynamic weighing start</li> <li>SCL : Scale change</li> <li>UNIT : Unit change (only FT-112)</li> </ul>








[ 244 RGHT IR : NO ]	The function of the right IR key NO : Disable ID1 : ID1 key ID2 : ID2 M+ : Memory plus key MRC : Memory read/clear key ZERO : Zero key TARE : Tare key CLR : Clear key T/C : Tare/Clear PRNT : Print	Page 33
[ 245 LEFT IR : NO ]	The function of the left IR key See the function of the right IR key	Page 33
[ 246 DELAY : 03 ]	Defining the delay time necessary for IR sensing. Delay time can be selected from 0.0 to 9.9	Page 33
[ 247 DISTANCE : 9 ]	Defining the distance necessary for IR sensing. This parameter can be selected from 1 to 9. 1: Nearest 9: Furthest	Page 33
[ 25- ENTRIES ]	<b>ENTRIES</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.	
[ 251 DATE : DMY ]	Date format DMY : DD.MM.YYYY MDY : MM.DD.YYYY YMD : YYYY.MM.DD	Page 33
[ 252 DATE SET : ]	Date setting XX.XX.XX	Page 33
[ 253 TIME SET : ]	Time adjust HH:MM	Page 33
[ 254 CN : ]	Consecutive number 1...65535	Page 109
[ 255 S. NAME : AbCC ]	Scale name. Maximum 20 character. Default is AbCC	
[ 26- PASSWORDS ]	<b>PASSWORD ENTRIES</b> Press  key or  key again to enter this menu. Press  key to go to the sub-block 21- or press  key to go to the next sub-block.	
[ 261 KEY LOCK : 11 ]	Key lock password. To lock keys and to erase grand total.	Page 38
[ 262 USER : 1111 ]	Set up password. NEW - CONFIRM	Page 39
[ 263 SERVICE : 1111 ]	Set up password. NEW - CONFIRM	Page 39








[3-- APPLICATION] Application Block

<p>[ 3-- APPLICATION ]</p>	<p><b>APPLICATION RELATED PARAMETERS MAIN BLOCK</b>          Press  key sequentially to access this main block,          or press  or  key to enter configuration parameters,          or press  key to go to the next block,          or press  key to exit from programming.</p>
<p>[ 31- SMARTAPP ]</p>	<p><b>SMARTAPP OPERATION SET UP</b>          Press  key or  key again to enter this menu.          Or press  key to go to the next sub-block.</p>
<p>[ 311 APPLICA : NO ]</p>	<p>SmartAPP application <span style="float: right;"><i>Page 88</i></span>          NO : SmartAPP function is disabled.          CHEC : Weight display and smartbar will operate <span style="float: right;"><i>Page 97</i></span>                    in check weighing,          CLAS : Weight display and smartbar will operate <span style="float: right;"><i>Page 94</i></span>                    in classifying          FILL : Weight display and smartbar will operate <span style="float: right;"><i>Page 100</i></span>                    in filling,          PACK : Weight display and SmartAPP will operate                    in packing,</p>
<p>[ 312 LIMITS : TOL ]</p>	<p>SmartAPP limits entry type <span style="float: right;"><i>Page 95, 98, 101</i></span>          VAL : The weight value entry          TOL : Absolute deviations from Target          % : percent deviation ( relative deviation )                from target value.</p>
<p>[ 313 INFODIS : NO ]</p>	<p>Information display at SmartAPP operation          NO : No application message          ID1T : ID1 data and Target          ID2T : ID2 data and Target</p>
<p>[ 314 DISPLAY : ALL ]</p>	<p>SmartAPP displaying <span style="float: right;"><i>Page 88</i></span>          NO : SmartAPP display is disabled,          BAR : Only Smartbar operates ,          COLO : Only display color warns the operator          ALL : Smartbar and display color functions are activated at smartbar.</p>
<p>[ 315 COLORS : RAAY ]</p>	<p>Display color change at SmartAPP operation.          RAAY : Red, amber, green, amber, yellow          YAAR : Yellow, amber, green, amber, red          RBAY : Red, blue, green, amber, yellow          YABR : Yellow, amber, green, blue, red</p>
<p>[ 316 CHANGE : STAB ]</p>	<p>The display colour changes in classifying and checkweighing          IMME : Immediately change even if scale isn't          STAB : stable.                    Change if the scale is stable.</p>
<p>[ 317 ACCUSTI : OKAY ]</p>	<p>Acoustic warning          NO : Disabled          OKAY : One beep if okay          OVER : One beep if over          CROS : One beep with every limit value crossover.</p>

[ 32- SMRT USAGE ]	<b>SMARTAPP USAGE</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 321 START : AUTO ]	Start MANU : SmartAPP starts by pressing key or serial port or digital input. AUTO : SmartAPP starts if the load is heavier than empty range. SAUT : SmartAPP starts if digital input is active. PORT : SmartAPP starts only with serial port command or with digital input.
[ 322 FILLING : GROS ]	Filling type GROS : Gross filling. NET : Net filling after taring the scale automatically.
[ 323 TAREDELA : 0.7 ]	Taring delay during filling X.X seconds Automatic taring is done after this delay in net filling.
[ 324 TOTAL : HORI ]	Totalization type <span style="float: right;"><i>Page 31</i></span> NO : Disabled HORI : Horizontal totalization VERT : Vertical totalization HAUT M+ applies automatically for horizontal totalization VAUT M+ applies automatically for vertical totalization
[ 325 GT ERASE : MRC ]	Grand total erase <span style="float: right;"><i>Page 58</i></span> MRC : Erase by pressing MRC key and Enter keys during GT displaying. PASS : Erase after entering keylock password.
[ 326 OUTPUTS : STAB ]	Output change in classifying and checkweighing. IMME : Immediately change even if scale is not STAB : stable. Change if the scale is stable.
[ 327 PACK TYP : GROS ]	Packing type <span style="float: right;"><i>Page 103</i></span> GROS : Packing without tare. TARE : Packing with auto taring. PT : Packing with specific tare. TAKE : Take a way packing. SNDW : Packing multi-box in big case.
[ 33- DYNAMIC ]	<b>WEIGHING OF UNSTABLE LOADS</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 331 OPERATE : NO ]	Operation type <span style="float: right;"><i>Page 30</i></span> NO : Disable KEY : Dynamic weighing starts after pressing the key if W >50e. SAUT : Dynamic weighing starts automatically if W >50e.

	CONT : Continuous dynamic weighing. MINW : Dynamic weighing starts if W > Min Weight. CMIN : Continuous dynamic weighing starts if W > Min Weight. : Weight.
[ 332 FILTER : 3.0 ]	Dynamic filtering time X.X seconds.
[ 333 DELAY : 0.0 ]	Dynamic operation delay. Dynamic operation is delayed until the scale settles after the scale is loaded. X.X seconds.
[ 34- KEY LOCK ]	<b>KEY LOCK</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 341 ON/OFF : USE ]	ON/ OFF key locking USE : Do not lock LOCK : Lock
[ 342 ID1 : USE ]	ID1 key locking USE : Do not lock LOCK : Lock
[ 343 ID2 : USE ]	ID2 key locking USE : Do not lock LOCK : Lock
[ 344 M+ : USE ]	M+ key locking USE : Do not lock LOCK : Lock
[ 345 MRC : USE ]	MRC key locking USE : Do not lock LOCK : Lock
[ 346 F1- KEY : USE ]	* key locking USE : Do not lock LOCK : Lock
[ 347 F2- KEY : USE ]	key locking USE : Do not lock LOCK : Lock
[ 348 TARE : USE ]	Tare key locking USE : Do not lock LOCK : Lock
[ 349 SET/CLR : USE ]	Clear / Set key locking USE : Do not lock LOCK : Lock
[ 34A ZEROING : USE ]	Zeroing key locking USE : Do not lock LOCK : Lock
[ 34B ENTER : USE ]	Enter key locking USE : Do not lock LOCK : Lock

[ 34C NUMERIC : USE ]	Numeric key locking USE : Do not lock LOCK : Lock
[ 34D RGHT IR : USE ]	Right IR key locking USE : Do not lock LOCK : Lock
[ 34E LEFT IR : USE ]	Left IR key locking USE : Do not lock LOCK : Lock
[ 35- DIG INPUTS ]	<b>DIGITAL INPUTS</b> (Appears if the option is installed) Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 351 INPUT 1 : NO ]	Input 1 <span style="float: right;"><i>Page 80</i></span>  NO : Not used ZERO : Zeroing TARE : Taring CLR : Clear PRNT : Print LOCK : Key lock DYST : Dynamic weighing start DYRE : Dynamic weighing reset FBUS : Controlled by fieldbus or BSI command.  M+ : Used for totalization operation. MR : Indicates the total value in the totalization. MC : MPRT : Deletes the total value in the totalization. SCL1 : Prints the totalization ticket. SCL2 : Switches to the scale-1. SCL  : Switches to the scale-2. SCL : Switches to the summing scale. Switches to the next scales sequentially.
[ 352 INPUT 2 : NO ]	Input 2 <span style="float: right;"><i>Page 80</i></span>  <i>The functions of Input 2 are the same as for Input 1</i>
[ 353 INPUT 3 : NO ]	Input 3 <span style="float: right;"><i>Page 80</i></span>  <i>The functions of Input 3 are the same as for Input 1</i>
[ 354 INPUT 4 : NO ]	Input 4 <span style="float: right;"><i>Page 80</i></span>  <i>The functions of Input 4 are the same as for Input 1</i>









[ 36- DIG OUTPUTS ]	<b>DIGITAL OUTPUTS</b> (Appears if the option is installed) Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 361 OUT 1 : NO ]	Digital output 1 <span style="float: right;"><i>Page 80</i></span>  NO : Disable SAIN : Absolute Indicated weight SIND : Indicated weight SANE : Absolute net weight SNET : Net weight SGRO : Gross weight SPC1 : Control mode-1 SPC2 : Control mode-2 STAB : Weighing is stable ZR I : Zero range of indicated weight ZR G : Zero range of gross weight ERRO : Error FBUS : Controlled by Fieldbus or BSI command
[ 362 OUT 2 : NO ]	Digital output 2 <span style="float: right;"><i>Page 80</i></span> <i>The functions of Output 2 are the same as for Output1 1</i>
[ 363 OUT 3 : NO ]	Digital output 3 <span style="float: right;"><i>Page 80</i></span> <i>The functions of Output 3 are the same as for Output1</i>
[ 364 OUT 4 : NO ]	Digital output 4 <span style="float: right;"><i>Page 80</i></span> <i>The functions of Output 4 are the same as for Output1</i>
[ 365 OUT 5 : NO ]	Digital output 5 <span style="float: right;"><i>Page 80</i></span> <i>The functions of Output 5 are the same as for Output1</i>
[ 366 ZR [d] : 1.0 ]	Zero range in XX.X division. Default is 1.0 d. <span style="float: right;"><i>Page 85</i></span>  For example: if the scale division is 0.5 kg and this parameter entry is 1.0 division. The output is activated if the indication is lower than 0.5 kg.
[ 37- IDENTIFICATI ]	<b>IDENTIFICATION DATA</b> Press  key or  key again to enter this menu. Press  key to go to the sub-block 31- or press  key to go to the next sub-block.
[ 371 NAMEDIS : TEMP ]	Identification name is displaying after pressing ID key NO : Identification name is not displayed. YES : Identification name is displayed until pressing enter or any alphanumeric key. TEMP : ID data is displayed after displaying the identification name for 2 seconds.
[ 372 ID1NAME : ID 1 ]	Identification name entry of ID1 key <span style="float: right;"><i>Page 78</i></span>  Maximum 16 characters. Default is ID 1.

<p>[ 373 ID1 LINK : NO ]</p>	<p style="text-align: right;"><i>Page 79</i></p> <p>Linked memories to ID1 memory</p> <p>NO : Not any linked memory.  APW : APW memory.  SET : Set memory  PT : PT memory.  SP : SET and PT memories.  AP : APW and PT memories.  AS : APW and SET memories.  ASP : APW and SET and PT memories.  ID2 : ID2 Memory</p>
<p>[ 374 ID2NAME : ID 2 ]</p>	<p style="text-align: right;"><i>Page 78</i></p> <p>Identification name entry of ID2 key</p> <p>Maximum 16 characters. Default is ID 2.</p>
<p>[ 375 ID2 LINK : NO ]</p>	<p style="text-align: right;"><i>Page 79</i></p> <p>Linked memories to ID2 memory</p> <p>NO : Not any linked memory.  APW : APW memory.  SET : Set memory  PT : PT memory.  SP : SET and PT memories.  AP : APW and PT memories.  AS : APW and SET memories.  ASP : APW and SET and PT memories.</p>

[5-- SCALE] Scale Block










IND	Industrial weighing	Parameter Selections in set up and calibration are allowed for industrial use of the instrument.
INDG	Industrial weighing only gross	Autozeroing, taring and power on zero are disabled. (Recommended for tank /silo weighing in gross.)
INDN	Industrial weighing net (taring can be enabled)	Autozeroing and power on zero are disabled. (Recommended for tank /silo weighing in net.)
OIML	Approved scale according to OIML	Metrology related parameters are restricted to limits of OIML R76 and EU type approval of the instrument.





After setting parameter 511, even if you set any parameter from the accepted range of selection of par 511, it is saved in the acceptable limit. For example, if taring is activated at INDG selection, it will be disabled while exiting from set up. For approved scales, set the parameters in main blocks 5, 6 and 8 and perform calibration carefully due to sealing of the scale for legal for trade applications.

[ 5-- SCALE ]		<p><b>SCALE RELATED PARAMETERS MAIN BLOCK</b></p> <p>Press  key sequentially to access this main block, or press  or  key to enter configuration parameters, or press  key to go to the next block, or press  key to exit from programming.</p> <p>If the second scale board is installed, [SCALE SELECT: 1 or 2 or SUM] prompt appears. Change the scale for setting it.</p>
[ 51- SET UP ]		<p><b>SCALE SET UP</b></p> <p>Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.</p>
[ 511 APROVAL : NO ]	M	<p>Approval</p> <p>IND : Industrial. All parameters can be freely selected.</p> <p>INDG : Industrial weighing of tank, hopper or silo in gross (Taring, AZTrack and Power on Zero are disabled)</p> <p>INDN : Industrial weighing of tank, hopper or silo in net (Taring enabled, AZT and Power on Zero is disabled)</p> <p>OIML : OIML approved scale.</p>
[ 512 HIGHRES : TOGG ]	M	<p>High resolution <span style="float: right;"><i>Page 29,</i></span></p> <p>TEMP : Temporary indication with key (Default)</p> <p>TOGG : Toggle. Start and end high resolution by pressing key in sequence.</p> <p>ALWA : Always high resolution</p>
[ 513 PWR ZERO : NO ]	M	<p>Power on zero. <span style="float: right;"><i>Page 28</i></span></p>


















		NO : Disable. 2% : ± 2% 2%LK : ± 2%, [ POWER ON ZERO ERR.] prompt cannot be erased. Call service. 10% : ± %10 15-5 : + %15, - %5 20% : ± %20	
[ 514 ZEROING : 50% ]	M	Zeroing range with key NO : Disable. 2% : ± 2% 3% : ± 3% 20% : ± 20% 50% : ± 50%	Page 28
[ 515 AZTRACK : NO ]	M	Automatic zero tracking NO : Disable. 0.3d : ± 0,3d 0.5d : ± 0,5d 1d : ± 1d 2d : ± 2d 3d : ± 3d	Page 28
[ 516 STABLE : 0.5d ]	M	Stability detection range NO : Disable. 0.3d : ± 0,3d 0.5d : ± 0,5d 1d : ± 1d 2d : ± 2d 3d : ± 3d 4d : ± 4d	
[ 517 STBTIME : 0.7 ]		Stability time The scale is considered as stable, when there is no change within <b>0.1... 9.9 second</b>	
[ 518 MIN TARE : ]		Minimum tare value for automatic taring  Taring is allowed if more than MIN TARE, XXX.XXX. Default is 20d.	
[ 519 MINWEIGT : ]		Minimum weight to produce printout. The printout is produced if the load is heavier than MINWEIGHT XXX.XXX. Default is 20d.	
[ 51A TILT : NO ]	M	Tilt switch to prevent incorrect weighing results in mobile scales. (Digital Input-4)	
		NO : Not used. OPEN : Normally open contact. CLOS : Normally closed contact.	













52- BUILD ]	<b>SCALE BUILD</b> Press  key or  key again to enter this menu. Press  key to go to the sub-block 51- or press  key to go to the next sub-block.
[ 521 UNIT : KG ]	M The scale unit Select NO, g, kg, t, oz or lb. <span style="float: right;"><i>Page 29</i></span>
[ 522 RANGE : SING ]	M Scale range SING : Single Range 2MR : 2 x Multi Range 3MR : 3 x Multi Range 2MI : 2 x Multi Interval 3MI : 3 x Multi Interval
[ 523 MAX : ]  CAP1/d1 CAP2/d2 CAP3/d3	M Scale capacity Max and division d Enter scale capacity and division after pressing  key. Capacities and divisions of MR and MI scales are entered as CAP1, d1, CAP2, d2, CAP3, d3.
[ 524 OVER : 9d ]	M Limit of Indication NO : Over indication after Max 1d : 1 division over Max 9d : 9 division over Max 2% : 2% over Max 5% : 5% over Max
[ 52A BATTERY : NO ]	M Battery management. NO : Battery management Disabled. YES : Battery management Enabled.
[ 52B AUTO OFF : NO ]	M Auto power off time for battery management. NO : Disabled Auto Power OFF. 1 : The scale is not used after 1 minute. 2 : The scale is not used after 2 minutes. 3 : The scale is not used after 3 minutes. 4 : The scale is not used after 4 minutes. 5 : The scale is not used after 5 minutes. 10 : The scale is not used after 10 minutes.
53- DLC SETUP ]	<b>DIGITAL LOAD CELL SETUP (Only FT-112D)</b> Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.
[ 532 QUANTITY : 01 ]	M Quantity of RC3D <span style="float: right;"><i>Page 75</i></span> Enter the quantity of DLC used in the scale. The quantity can be entered between 1 and 16.
[ 533 ADDRESSING ]	M Addressing of digital load cells Enter serial number after press  key.

[ 54- SHIFT ADJUST ]	<b>SHIFT / ECCENTRICITY ADJUSTMENT (Only FT-112D)</b> Press  key or  key again to enter this menu. Press  key to go to beginning of the sub-block or press  key to go to the next main-block.	
[ 541 METHOD : CELL ]	M	Adjustment method <span style="float: right;"><i>Page 76</i></span> CELL : Individual load cell shift PAIR : adjustment Sectional pair shift adjustment
[ 542 AUTO ADJUST ]	M	Automatic Eccentricity Adjustment The eccentricity correction of scale is performed automatically.
[ 543 MANUAL ADJUS ]	M	Manual Adjustment The eccentricity correction of scale is performed manually.
[ 544 SET TO 1 : NO ]	M	Temporarily set shift constants to 1 NO : Normal operation (entered shift constants are used). YES : Test mode (shift constants are equal to 1).

[6-- CALB / ADJUST] Calibration and Adjustment Block











<p>[ 6-- CALIB / ADJUST ]</p>	<p><b>SCALE ZERO AND SCALE SETTING MAIN BLOCK</b>          Press  key sequentially to access this main block,          or press  or  key to enter configuration parameters,          or press  key to go to the next block,          or press  key to exit from programming.          If the second scale board is installed, [SCALE: 1 or 2 or SUM ] prompt appears. Change the scale for setting it.</p>
<p>[ 61- CALIBRATION ]</p>	<p><b>CALIBRATION</b>          Press  key or  key again to enter this menu.          Or press  key for the next sub-block.</p>
<p>[ 611 TEST WEIGHT ]</p>	<p>M Scale calibration with test weight</p>
<p>[ 612 LINEARIZATIO ]</p>	<p>M 3-point scale calibration to increase linearization</p>
<p>[ 613 ECAL ]</p>	<p>M eCal electronic calibration without test weight</p>
<p>[ 62- ADJUSTMENT ]</p>	<p><b>ADJUSTMENTS</b>          Press  key or  key again to enter this menu.          Press  key for the next sub-block.</p>
<p>[ 621 ZERO ADJUSTM ]</p>	<p>M Zero adjustment</p>
<p>[ 622 SPAN ADJUSTM ]</p>	<p>M Span adjustment</p>
<p>[ 623 S UNDER LOAD ]</p>	<p>M Span adjustment of loaded scale          Span adjustment under load          Span adjustment with temporary zeroing</p>
<p>[ 624 GRAVITY CAL ]</p>	<p>M Gravity acceleration of the place of calibration.</p>
<p>[ 625 GRAVITY USAGE ]</p>	<p>M Gravity acceleration of the place of the use.</p>
<p>[ 63- COEFFICIENTS ]</p>	<p><b>CALIBRATION COEFFICIENTS</b>          Press  key or  key again to enter this menu.          Press  key to go to the beginning of the sub-block or press  key for the main-block.</p>
<p>[ 631 LOAD COEFFIC ]</p>	<p>M The load weight used in the calibration is indicated here.</p>
<p>[ 632 ZERO COEFFIC ]</p>	<p>M This coefficient determines the zero point of the scale.</p>
<p>[ 633 GAIN COEFFIC ]</p>	<p>M This coefficient is related to the gain factor of the scale.</p>

[8-- METROLOGY] Metrology Block

<p>[ 8-- METROLOGY ]</p>	<p><b>METROLOGY MAIN BLOCK</b>          Press  key sequentially to access this main block,          or press  or  key to enter configuration parameters,          or press  key to go to the next block,          or press  key to exit from programming.</p>
<p>[ 81- ALIBI MEMORY ]</p>	<p><b>ALIBI MEMORY</b>          Press  key or  key again to enter this menu.          Or press  key for the next sub-block.</p>
<p>[ 811 ALIBI : NO ]           [ 812 PORT : PRNT ]</p>	<p>M Alibi memory <span style="float: right;"><i>Page 36</i></span>          NO : Disable          YES : Enable           Select the Alibi data transfer port.          PRNT : to the printer port.          R232 : to the RS232C.          USB : to the USB          ETH : to the Ethernet TCP/IP.</p>
<p>[ 813 ACCESS : NUM ]</p>	<p>Access to the Alibi memory record <span style="float: right;"><i>Page 36</i></span>          NUM : Search by Alibi number          DATE : Search by date          NET : Search by net value (absolute)          GROS : Search by gross value          TARE : Search by tare value          CN : Search by Consecutive value</p>
<p>[ 814 TRANSFER : NO ]</p>	<p>Transfer Alibi memory records <span style="float: right;"><i>Page 37</i></span>          NO : No          PRNT : Transfer alibi memory record                    to the printer port</p>
<p>[ 815 ALIBI INFO ]</p>	<p>Transfer alibi memory information. <span style="float: right;"><i>Page 37</i></span></p>
<p>[ 816 FORMAT : NO ]</p>	<p>M Format alibi memory SD card. <span style="float: right;"><i>Page 37</i></span>          NO : No          YES : Start formatting alibi SD card.  <i>Attention: Only authorized person !!!</i></p>
<p>[ 82- INFORMATION ]</p>	<p><b>METROLOGIC INFORMATION</b>          Press  key or  key again to enter this menu.          Press  key to go to the beginning of the sub-block or press  key for the main-block.</p>
<p>[ 821 CAL COUNTER ]</p>	<p>This service counter displays the number of times the instrument was accessed using service password when calibration switch enabled. Count number increases at exit from set-up mode if service password is used and calibration is enabled to enter set-up mode.</p>
<p>[ 822 CONFIG COUNT ]</p>	<p>This non-resettable and protected counter displays number of times the instrument was accessed. Count number increases with every exit from set-up mode.</p>
<p>[ 823 NEXT VERIFIC ]</p>	<p>Date of the next verification</p>

[9-- DIAGNOSTIC] Diagnostic Block

<p>[ 9-- DIAGNOSTIC ]</p>	<p><b>DIAGNOSTIC MAIN BLOCK</b>          Press  key sequentially to access this main block,          or press  or  key to enter configuration parameters,          or press  key to go to the next block,          or press  key to exit from programming.</p>
<p>[ 91- HARDWARETEST ]</p>	<p><b>HARDWARE TESTING</b>          Press  key or  key again to enter this menu.          Or press  key for the next sub-block.</p>
<p>[ 911 KEY ]</p>	<p>Key testing</p>
<p>[ 912 RS232-1 ]</p>	<p>RS232C-1 serial port testing</p>
<p>[ 913 RS232-2 ]</p>	<p>RS232C-2 serial port testing</p>
<p>[ 914 RS485 ]</p>	<p>RS485 serial port testing</p>
<p>[ 915 USB ]</p>	<p>USB port testing</p>
<p>[ 916 IN / OUT ]</p>	<p>Digital Input / Output testing</p>
<p>[ 917 DISPLAY ]</p>	<p>Display testing</p>
<p>[ 918 LC SIGNAL mV ]</p>	<p>Load cell signal measuring in millivolt Only FT-112</p>
<p>[ 918 DLC COUNTS ]</p>	<p>Internal count values of the digital Load cell(s) Only FT-112D</p>
<p>[ 919 PRINTER ]</p>	<p>Printer testing</p>
<p>[ 91A ID DEVICE ]</p>	<p>ID device (bar code reader, card reader, RFID) testing.</p>
<p>[ 92- HISTORY ]</p>	<p><b>HISTORY</b>          Press  key or  key again to enter this menu.          Or press  key for the next sub-block.</p>
<p>[ 921 PEAK LOAD ]</p>	<p>The last 20 peak loads listed in this parameter.</p>
<p>[ 922 UNDER LOGS ]</p>	<p>The last 20 under errors listed in this parameter.</p>
<p>[ 923 ERROR LOGS ]</p>	<p>The last 20 errors listed in this parameter.</p>
<p>[ 924 ENTRY LOGS ]</p>	<p>The last 20 Service/User entry listed in this parameter.</p>

[ 96- BACKUP / RECOVER ]	<p><b>BACKUP / RECOVER</b></p> <p>Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.</p>
[ 961 BACK UP : ALL ]	<p>Backup the instrument to SD card.</p> <p>ALL Backup of all the instrument parameter to SD card. <i>Page</i></p>
[ 962 RECOVER : RCPT ]	<p>M Restore the instrument from SD card. <i>Page</i></p> <p>RCPT Receipt build configuration and receipt in the usage (4-- parameter group).</p> <p>SETP Parameters of 1--, 2-- and 3-- parameter groups.</p> <p>CAL Parameter group 5-- and calibration coefficients.</p> <p>ALL All parameters and calibration</p> <p><i>WARNING: CAL and ALL items can be loaded if the calibration dip switch is at ON position.</i></p>
[ 97- FIRMWARE ]	<p><b>FIRMWARE INFORMATION</b></p> <p>Press  key or  key again to enter this menu. Or press  key to go to the next sub-block.</p>
[ 971 INSTRUMENT ]	XX.XX
[ 972 OPTION ]	XX.XX
[ 973 UPGRADE ]	<p>M Firmware upgrade</p> <p>Call Flintec service or dealer to upgrade.</p>
[ 974 DLC BOARD ]	<p>XX.XX (FT-112D only))</p> <p>Call Flintec service or dealer to upgrade.</p>
[ 99- DEFAULT ]	<p><b>DEFAULTS LOADING</b></p> <p>Press  key or  key again to enter this menu. Press  key to go to the beginning of sub-block or press  key for the main-block.</p>
[ 993 PARAMET DEF ]	<p>M Load default parameter (Calibration do not change)</p>
[ 994 FACTORY DEF ]	<p>M Load factory defaults</p>
[ 995 DEFAULT ADDR ]	<p>M Load default address to digital load cell. (only FT-112D)</p> <p>The default address feature solves the problem and provides access to the load cell functions even if its address and its serial number are not known.</p> <p><i>WARNING: The DLC must be disconnected from the network and connect as single.</i></p>


## 6.6 Calibration

Please read this document carefully and select the parameter values which fits your application before programming the instrument. Refer to section 6 on page 38 for entering the menu.




**Warning:** *You cannot change the legally related parameter values and calibration after sealing the instrument in legal usage. Ensure the proper adjustments have been done before sealing the scale.*

### Scale definition

Before the calibration can be performed the capacity and resolution of the scale must be defined.





Press  key at the [ 523 MAX / d ] prompt and set the required capacity and resolution of the scale. Then continue with the following:

Calibration involves emptying the scale then placing a known test weight on an empty platform and allowing the FT-112 indicator to capture values for zero and scale. Calibration is performed as follows:

1. Press  key at the [ 611 TEST WEIGHT ] prompt to start the calibration.
2. At the [ UNLOAD THE SCALE ] prompt, remove any weight from the platform, then press  key.
3. The terminal automatically starts to capture zero and the [ WAIT ] message indicating the operation is in progress.
4. After the [ LOAD THE SCALE ] prompt, the test weight value will be used for the calibration shown on the display as [ XXXXXX ]. If the value of the test weights that will be used is different from the value shown on the display, type the new value via numeric keys. A minimum of 20% of scale capacity is necessary for calibration; FLINTEC recommends 50 to 100%. A calibration error will be produced if insufficient weight is used.
5. Place the test weights or another practical weight on the scale.
6. Press  key to start scale calibration. [ WAIT ] message will shown on the display 10 seconds while scale calibration is being performed.

### 6.6.1 Linearity Correction

Multipoint calibration in this parameter improves the scale performance.



1. Press  key at the [ 612 LINEARIZATIO ] prompt to start the calibration.
2. At the [ UNLOAD THE SCALE ] prompt, remove any weight from the platform, then press  key.
3. The terminal automatically starts to capture zero and the [ WAIT ] message indicating the operation is in progress.
4. At the [ LOAD 1 ] prompt, the test weight value will be used for the first step calibration shown on the display as [ XXXXXX ]. If the value of the test weights that will be used is different from the value shown on the display, type the new value via numeric keys. This load value should be **between 35% and 65% of the scale's capacity.**
5. Place the test weights or another practical weight on the scale.
6. Press  key to start scale calibration. [ WAIT ] message will be shown on the display 10 seconds while the first scale calibration is being performed.
7. At the [ LOAD 2 ] prompt, the test weight value will be used for the second step calibration shown on the display as [ XXXXXX ]. If the value of the test weights that will be used is different from the value shown on the display, type the new value via numeric keys. Place weight on the platform equal to at least 90% of scale capacity, preferable at scale capacity as much as is practical.
8. Place the test weights or another practical weight on the scale.
9. Press  to start second step scale calibration. [ WAIT ] message will be shown on the display 10 seconds while the scale calibration is being performed.





## 6.6.2 Zero and Span Adjustments

In this sub-block you can only perform zero adjustment or scale adjustment automatically without performing full calibration.

### Zero Adjustment




1. Press  key at the [ 621 ZERO ADJUSTM ] prompt to start the zero adjustment.
2. At the [ UNLOAD THE SCALE] prompt, remove any weights from the scale, then press  key.
3. The terminal automatically starts to capture zero and the [ WAIT ] message indicating the operation is in progress.

### Span Adjustment

1. Press  key at the [ 622 SCALE ADJUSTM ] prompt to start the scale adjustment.
2. At the [ XXXXXX ] prompt, the test weight value will be used for the calibration shown on the display. If the value of the test weights that will be used is different from the value shown on the display, type in the new value via tare and zero keys. A minimum of 20% of scale capacity is necessary for calibration; FLINTEC recommends 50 to 100%. A calibration error will result if insufficient weight is used.
3. Place the test weights or another practical weight on the scale.
4. Press  to start scale calibration. [ WAIT ] message will appear on the display for 10 seconds while scale calibration is being performed.

### Span Adjustment Under Load

This parameter is used to perform scale adjustment of a scale without lifting the load on it. This operation is especially used for scale adjustment for filled tanks. You can make scale adjustment without emptying the tank.

1. Press  key at the [ 623 S UNDER LOAD ] prompt to start the scale adjustment under load.
2. [ P.ZERO ] prompt appears on the display to indicate the scale load that will be determined as temporary zero.
3. Press  key and the display will show [ WAIT ] message during temporary zero adjustment.
4. At the [ LOAD ] prompt and then [ XXXXXX ] a test weight value will be suggested for the calibration. If the value of the test weights that will be used is different from the value shown on the display, type the new value via numeric keys.
5. Place the test weights or another practical weight on the scale.
6. Press  to start scale calibration. [ WAIT ] message will appear on the display for 10 seconds while scale calibration is being performed.

### 6.6.3 eCal Electronic Calibration

**IMPORTANT NOTE:** The eCal electronic calibration is based on the zero adjustment by entering the dead load value or automatic zero adjustment and calculating scale adjustment by entering the load cell data.

1. Full calibration cancels the eCal performed before.
2. Scale adjustment cancels the eCal performed before.
3. Gravity adjustment cannot be done after eCal.
4. "Span adjustment under load "cannot be done after eCal.


This parameter lets you perform calibration without using any test weights. FT-112 A/D coefficients are adjusted in production for increasing eCal accuracy. The calibration coefficients are calculated by scale capacity, total load cell capacity, load cell full scale output and estimated dead load. If the conditions are convenient for zero calibration, you may perform automatic zero adjustment instead of entering estimated preload.

#### [TOTAL LC CAPACIT ] [XXXXXX]

Enter total load cell capacity via numerical keys and press  key to go to the next step.

Example: If the weighing system has 4 pcs 1000 kg load cells, enter 4000.



#### [AVERAGE LC OUT ] [XXXXXX]



Enter load cell output in mV/V via numerical keys. If the weighing system has more than one load cell, calculate the mean value of load cells outputs mV/V indicated on the certificates of the load cells. Press  key to go to the next step.

Example: If load cell outputs are LC1: 2.0010, LC2: 1.9998, LC3:1.9986 and LC4:2.0002, the mean value will be:


Mean of LC outputs =  $(2.0010 + 1.9998 + 1.9986 + 2.0002) \div 4 = 1.9999$  mV/V.


#### [ZERO ADJUST: YES]

If the scale is empty and you want to perform automatic zero adjustment instead of entering estimated dead load (see next step), press  key and [ UNLOAD THE SCALE ] appears. Then press  key to start zero calibration after unloading the scale. The display will show [ WAIT ] message during zero adjustment. During this time the scale must be unloaded and stable. Approximately 10 seconds later electronic calibration is performed.

If the scale is not empty or you prefer to enter estimated preload value, press the up  key to select "NO " before pressing the  key.

#### [ESTIM DEAD LOAD] [XXXXXX]

Enter the dead load value of the weighing system in current unit by using numerical keys. Press the  key to go to the next step.





**Notes:** Dead load correction: You may change the dead load value after testing the scale and adding the displayed gross weight value of unloaded scale to the dead load value. Do not press  key after switching on the instrument after calibration, and the power on zero and automatic zero tracking should be disabled to determine the dead load error.

Dead load value is cancelled after automatic zero adjustment.

## 6.6.4 Gravity adjustment

**WARNING:** This parameter should ONLY be used on a scale that will be initially verified in two stages by gravity adjustment in legal metrology applications.

The gravity acceleration values of the place of the calibration and of the place of the usage are entered in this parameter. Gravity usage value is set to the gravity calibration value after calibration.

1. Press  key to access this parameter.
2. [ 624 GRAVITY CAL : 9.80255] prompt appears. Enter the gravity acceleration value of the place of the calibration. Confirm with  key.
3. [ 625 GRAVITY USAG : 9.80255] prompt appears after pressing  key. Enter the gravity acceleration value of the place of the scale usage.
4. Confirm with  key.

## 6.6.5 Calibration coefficients

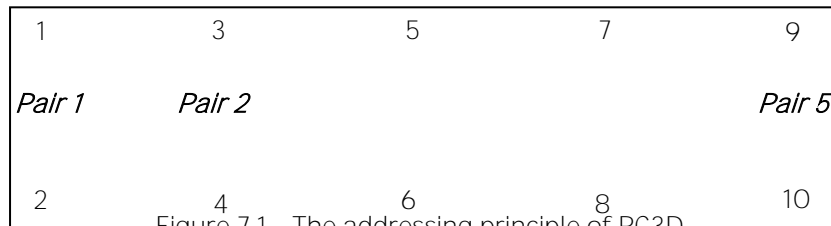
Calibration coefficients are calculated after calibration and saved into the memory for usage until next calibration. Note these coefficients to use them in case of calibration lost. Changing them slightly improves the scale accuracy without recalibration. Entering these values to another indicator may cause slightly reducing the weighing accuracy due to offset differences between two analogue digital circuits.

# 7 DIGITAL LOAD CELLS (DLC)








For the pin configuration of the digital load cells RC3D please see page 21. It is possible to connect all RC3D load cells to the terminal and address them later.

## 7.1 Addressing of Digital Load cells

The following diagram shows the recommended load cell addressing principle. Remember, if pair shift adjustment is selected, 1 and 2, 3 and 4 etc. will be sectional pairs.











Addressing of RC3D digital load cells

1. Press  key at the [ 533 ADDRESSING ] prompt to start the addressing.
2. The message [ WAIT ] appears for a short time and then [ DLC NUMBER :01 ] appears. Here 01 is the address of the DLC.
3. Press  key to enter the serial number of the DLC.
4. After the [ SERIAL: ] prompt appears, type the serial number value via numerical keys.
5. Press  key to start addressing the digital load cell. [ ADDRESSING DLC ] message appears on the display for 10 seconds while addressing is being performed.
6. The next DLC number appears on the display. Press  key to enter the serial number and you repeat from item 4 until all DLCs have been addressed.
7. [ 532 QUANTITY :XY ] message appears after addressing all load cells.
8. Press  key to access to Shift adjustment block or press  key until [ SAVE : YES ] prompt appears on the display and press  key to save the changes.

**IMPORTANT NOTE:** If the [E81 CANNOT ADDR] error message appears during the addressing, set the digital load cell to its default settings, and try addressing again. Refer to Parameter 995.

Addressing of RC3D digital load cells (replacement of a DLC)

1. Press  key at the [ 533 ADDRESSING ] prompt to start the addressing.
2. The message [ WAIT ] appears for a short time and then [ DLC NUMBER :01 ] message appears to indicate load cell address.
3. Press  key until appearing of the address of the new load cell to be installed appears.
4. Connect the new load cell to junction box.
5. Press  key to start addressing of the load cell.
6. Enter the serial number of the load cell. Press  key for addressing the load cell.
7. After the following DLC number has appeared on the display, press  key. [ 532 QUANTITY :XY ] message appears.
8. Press  key to access to Shift adjustment block or press  key until [ SAVE : YES ] prompt appears on the display and press  key to save the changes.

## Shift adjustment method (corner adjustment)





A shift adjustment is carried out to eliminate weight reading differences placing a load on different positions on the platform. A calibration is required after shift adjustment.

Each load cell or each sectional pair should be loaded for eccentricity adjustment. Individual shift adjustment is used to eliminate errors in installations that have excessive eccentricity errors. Typical application of sectional pairs are rolling loads on the platform like track scales. Sectional pairs adjustment is easier and faster.

## Automatic Shift Adjustment

**IMPORTANT NOTE:** This adjustment must be performed before calibration. Load the scale few times before performing automatic shift adjustment.







Small mismatches in mechanical and electronic gain of the load sensing paths can cause the same test weight to produce slightly different readings, depending on the location of the test weight on the scale. To eliminate these eccentricity errors, shift adjustment is performed as;

1. Press  key at the [ 542 AUTO ADJUST ] prompt to start the shift adjustment.
2. At the [ ZERO CALIBRATION ] prompt, press  key to go to next step.
3. [ UNLOAD THE PAN ] prompt, remove any weight on the platform, then press  key.
4. The terminal automatically starts to capture zero and the [ WAIT ] message indicating the operation is in progress.
5. After the [ LOAD DLC NO : 01 ] or [ LOAD PAIR NO : 01 ] prompt, place the weight of at least 10% of the DLC capacity as close as possible to the independent load cell or sectional pair 01. Press  key.
6. The terminal automatically starts to capture the values from DLCs and the [ WAIT ] message indicating the operation is in progress.
7. The following load cell address or pairs number appears on the display and you may repeat from item 5 until all DLCs have been adjusted.
8. After end of adjustment the following sub-block appears.

## Manual Shift Adjustment




**IMPORTANT NOTE:** The shift adjustment must be performed before calibration.

Manual shift adjustment is done to improve the small shift errors manually, to enter shift coefficients of load cells after changing the instrument which eliminates to perform automatic shift adjustment.




1. Press  key at the [ 543 MANUAL ADJUS ] prompt to start the manual shift adjustment.
2. At the [ DLC COEFF : 01 ] and [ 1.0000 ] prompt, enter the coefficient by pressing the numerical keys and press  key to go to following item.
3. After entering the value of the last coefficient press  key to check values again or press  key to exit.
4. Press  key until [ SAVE : YES ] prompt seen on the display. Press  key to save the changes into the memory

## Setting Shift Coefficients of all Load cells to 1

Setting all coefficients to 1 temporary might be needed to service the scale without losing the shift coefficients.

1. Press  key at the [ 544 SET TO 1 : NO ] prompt to adjust the parameter.
2. It will be [ 544 SET TO 1 : YES ], press  key until [ SAVE : YES ] prompt seen on the display.
3. Press  key to save the changes into the memory.

Do not forget to reload coefficients after testing the scale as;

1. Press  key at the [ 544 SET TO 1 : YES ] prompt to adjust the parameter.
2. It will be [ 544 SET TO 1 : NO ], press  key until [ SAVE : YES ] prompt seen on the display.
3. Press  key to save the changes into the memory.

## 8 WORKING WITH TWO SCALES (FT-112)

**APPLICATION:** To use the weighing terminal with 2 scales and for summing the loads on the scales. Typical usages are weighing or piece counting on 2 different capacity scales, parallel weighbridges, fast weighing on 2 serial conveyor scales, short items and weighing of long items placed on both conveyor, serial weighbridges for weighing short and long vehicles fast.






**IMPORTANT NOTE 1** The optional second scale board should be installed. Both scales and summing scale should be set up and calibrated to use this feature.

**IMPORTANT NOTE-2:** When configuring a summing scale, both platforms (scale1 and scale2) should have the same capacity and division. The SUM (1+2) scale should be considered a 3<sup>rd</sup> scale with the components of both scale1 and scale2. i.e., if scale1 and scale2 have each 4 load cells consider SUM (1+2) to be a single 8 load cell scale when setting MAX and d. For approved scales SUM must comply with module requirements.


**RELATED PARAMETERS:** Main block 5-- .

Up to 2 weighing scales can be connected to the FT-112. Depending on the second scale board in the instrument and set up, 2 scales can be used in parallel or serial with summing scale feature of the weighing terminal. Only the selected scale is displayed. The summing scale feature can be used for parallel usage of the scales or for weighing the heavier or longer items placed on serial placed scales.

### Enabling the Summing scale

1. Enter the programming menu and access to 5-- block and press  key.
2. After [ SCALE SELECT : 1 ] message prompt and press  key two times to select the 'SUM' then press  key (you will see '1+2' sign at Left-bottom of display).  
*Note: Both platforms (scale1 and scale2) should have the same capacity and division settings.*
3. Enter the capacity and division for summing scale.
4. Press  key until [ SAVE : YES ] prompt seen on the display and press  key to save the changes into the memory.

### Switch over weighing scales and summing scale

1. Set up one of the **function keys** (e.g.,  key) as a scale select key (sub-block 24, [page 55](#)). This key will be used to switch between the scales.
2. In the parameter "SCALE" (main-block 5-- , [page 63](#)) select Scale 1, Scale 2 or Sum-scale and separately define the selected scales.

**IMPORTANT NOTE:** The capacity and resolution of ALL scales must be separately configured.

3. Calibrate Scale 1 and scale 2 consecutively (main-block 6--)
4. After successful configuration and calibration of the scales, you can switch between the scales using the defined key.

## 9 IDENTIFICATION DATA RECORD (ID1, ID2)

**APPLICATION:** To enter identification data into the instrument to printout or to transfer the data together with specific information.

**RELATED PARAMETERS:** Sub-block 37- .



FT-112 indicator has 2 identification keys, ID1 and ID2, positioned under the display for storing identification data. Each identification key has an alphanumeric identification name and data. The identification data can be saved in the ID1 and ID2 memories. Each has 500 pieces, 32 character identification data record size.

The identification data can be entered via keys or selected from ID memory to transfer together with the weight value. The length of identification name can have maximum 16 characters and the length of identification data can have up to 32 characters. ID name is entered in the programming mode.







ID data in the memory can be linked to the PT, SET and/or APW memory records. This feature gives advantage to select the related records automatically by selecting ID from memory. For example, if APW memory is linked to ID1 memory, the 123<sup>th</sup> record in the APW memory is loaded automatically after loading 123<sup>th</sup> record from ID1 memory.

The description below for ID1 key is valid for ID2 as well.





### Identification data entering via alphanumeric keys

1. Press the identification key .
2. Enter the identification data, maximum 32 digits via alphanumeric keys.
3. Confirm with  key.

### Identification data record in to the ID memory

1. Press  key for more than 2 seconds in weighing operation. The [ MEMORY ] prompt will be displayed
2. Press  key to enter ID1 memory. The last used memory code appears as [ID1 : 123 ]
3. Enter the memory code numerically and press  key
4. The ID code and identification data in the memory appears on the display
5. Enter the new alphanumeric ID data up to 32 digits and press  key
6. The following memory code appears on the display to go on the ID data entry. You may press  key to enter ID data in the following memory or you may repeat from item 3 to enter the new memory record number
7. To return the operation press  key.











### Identification data selection from ID memory

1. Press the identification key . The ID1 data appears
2. Press  key to enter the memory.
3. After the last used code appears [ ID1 :123 ], enter the ID memory code of the item.
4. Press  key to select the identification data which is displayed for a short while. The instrument returns to the operation mode after loading the identification data. If there is any linked memory to the ID memory, it will be selected automatically.
5. Or press  key to return without any selection.





## Data Entry to the linked memories together with ID memory

You may enter data in the related memories together with data entry to the items from ID memories for easy use.

For example, if ID1 is interrelated with SET and PT memories by **parameter 334**, the data entry can be done to the item 111 as described below.



1. Press  key for more than 2 seconds in weighing operation. The [ MEMORY ] prompt will be displayed.
2. Press  key to enter ID1 memory. [ID1: 001 ] message appears. The number on the right side is the memory code.
3. Enter a numeric code (for example 111) or use  or  keys to navigate within the ID memory.
4. The Identification data in the memory appears on the display after pressing  key. Enter the new alphanumeric ID data up to 32 digits and press  key.
5. The limit values of the item shows [ SET 111-SP1 ] [ 0.0 kg ] on the display. Enter the limit values in sequence.
6. The specific tare of the item appears on the display [ PT 111: ] [ 0.0 kg ]. Enter the new PT value and press  key.
7. After pressing the  key and entering PT value the following item appears [ ID1 112 : ].
8. Press  key to go on entry or press  key to exit.

## Select data from linked memories

1. Press the identification key . The ID1 data appears
2. Press  key to enter the memory
3. After the last used code appears [ ID1 :123 ], enter the ID memory code of the item.
4. Press  key to select the identification data and link data to ID1 which are displayed in sequence. The instrument returns to the operation mode after loading the selected item.
5. Or press  key to return without any selection.

## ID data entry from barcode reader or ID device

**RELATED PARAMETERS** : Sub-block 18- and parameters 111, 121 and 131.

1. Press the identification key .
2. Read the barcode.
3. Confirm with  key.



# 10 DIGITAL INPUTS -OUTPUTS / SETPOINTS AND LIMITS

**APPLICATION:** Digital inputs are used to control the instrument and the digital outputs can be used at basic weighing, checkweighing, classifying, packing and filling applications to control gates, valves etc. or to produce alarm.

**CONDITION:** *The Digital I/O are included on the analogue output option or on one of the fieldbus options. One of the option boards should be installed to use digital control inputs and setpoint output signals.*

**RELATED PARAMETERS:** Sub-blocks 35- and 36-.

## 10.1 Electrical Connection

### 10.1.1 Digital Inputs

FT-112 digital inputs which are independently programmable for zeroing, taring, clear, print, key lock and as a fieldbus input port in basic weighing usage of the weighing terminal. If the instrument is programmed for any SmartAPP application, the inputs are configured for this usage.

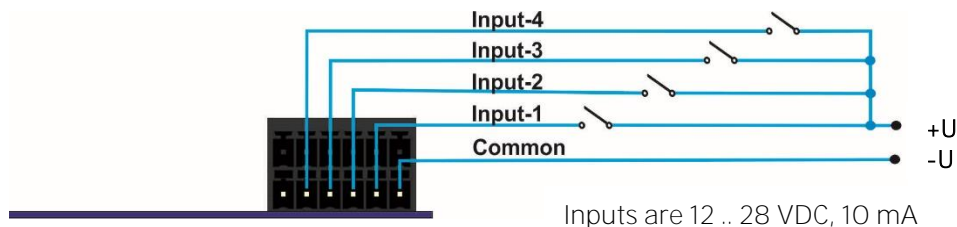


Figure 4-14 - Inputs connection diagram

### 10.1.2 Digital Outputs:

FT-112 instrument's digital outputs can be programmable as a free setpoint or as a dialogue port to control them with host commands.

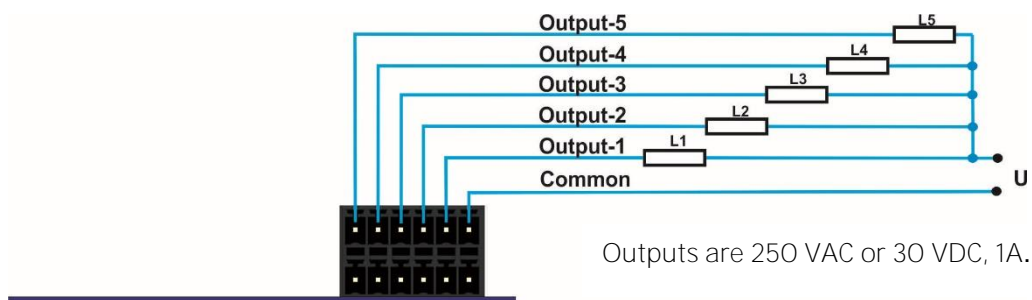


Figure 4-15 - Outputs connection diagram

You may enter limit values of the item after pressing  key for more than 2 seconds or you may call them from Memory. Set Memory has a 500 item record capacity.

The 5 limit values of an item are entered as weight values at basic weighing. At SmartAPP applications, 5 limit values of an item and zero/empty range should be entered.

The Digital I/O option board, analogue output option or one of the fieldbus option boards should be installed in the weighing terminal to use digital control inputs and produce output signals.

The digital inputs and outputs are programmable to use them as a Remote IO of PLC via fieldbus additional to their usage at weighing related functions. Remote IO's of PLC can be used for level control of material tank, conveyor control, solenoid control, alarm etc.

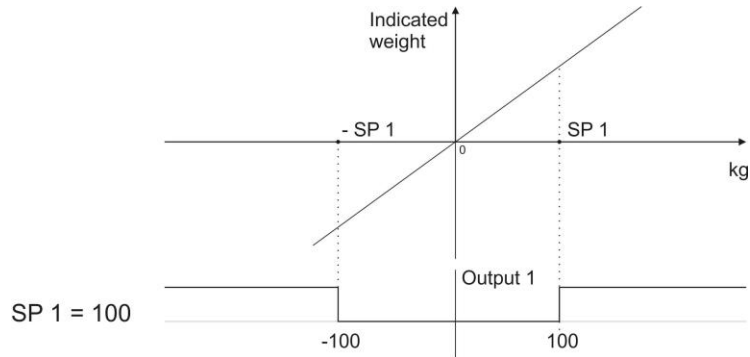
## Digital Inputs

<p><b>Key functions via Inputs</b>          Zeroing, Taring, Clear, Print          The key functions are executed via digital inputs. Taring via digital input is shown in the drawing as an example.</p>	
<p><b>Remote Input over Fieldbus or BSI</b>          The digital input(s) can be followed by PLC as a Remote input, if the instrument is equipped with any fieldbus option. Refer to related fieldbus command table to receive the status of inputs. This usage is independent from the weighing process of the instrument.</p>	

## Digital Outputs

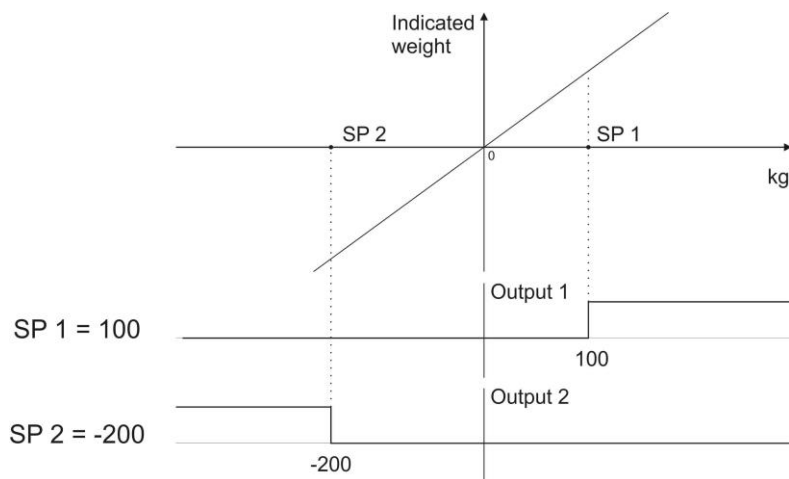
### S AIN - Free setpoint of absolute indicated weight (previously SPAI)

The digital output is activated with comparing the set point value and absolute indicated weight value as indicated in the drawing below.



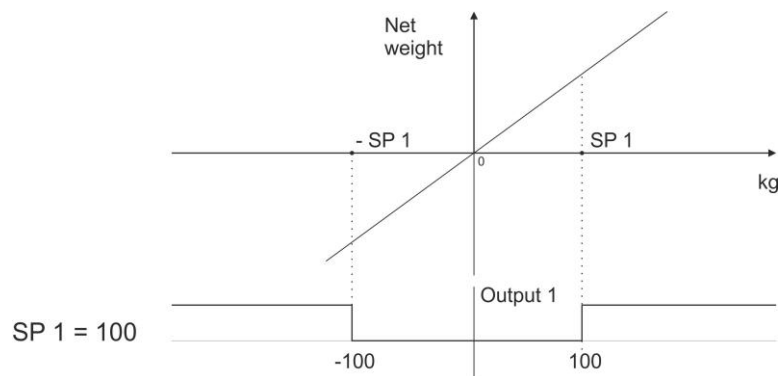
### S IND - Free setpoint of indicated weight (previously SP I)

The digital output is activated with comparing the set point value and absolute gross weight value as indicated below.



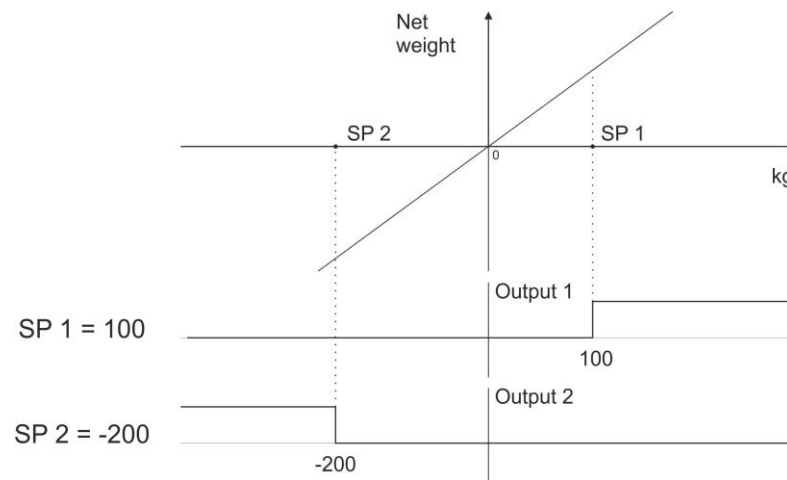
### S ANE - Free setpoint of absolute net weight

The digital output is activated with comparing the set point value and absolute net weight value as seen below.



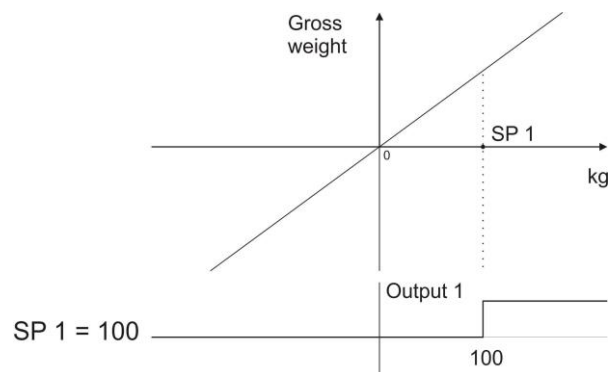
### S NET Free setpoint of net weight

The digital output is activated with comparing the set point value and net weight value as seen below.



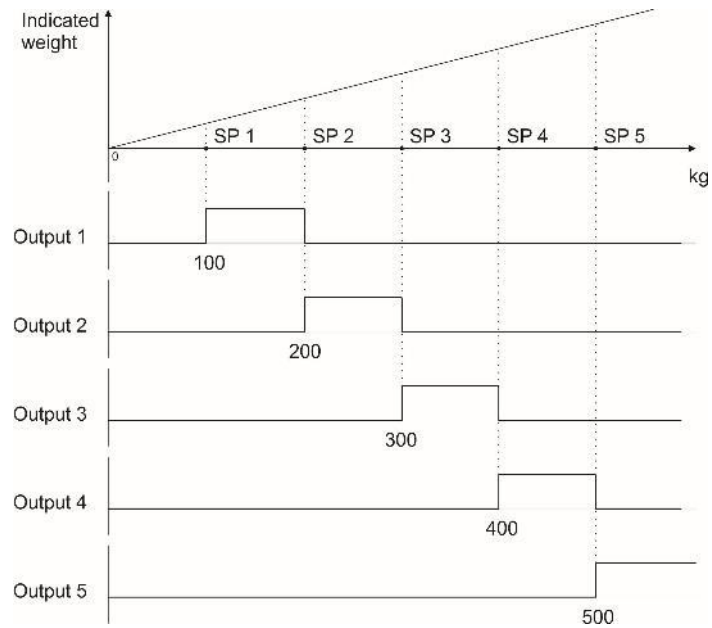
### SP GRO - Free setpoint of gross weight (previously SP G)

The digital output is activated with comparing the set point value and gross weight value as indicated below.



### SPC1 Control mode 1

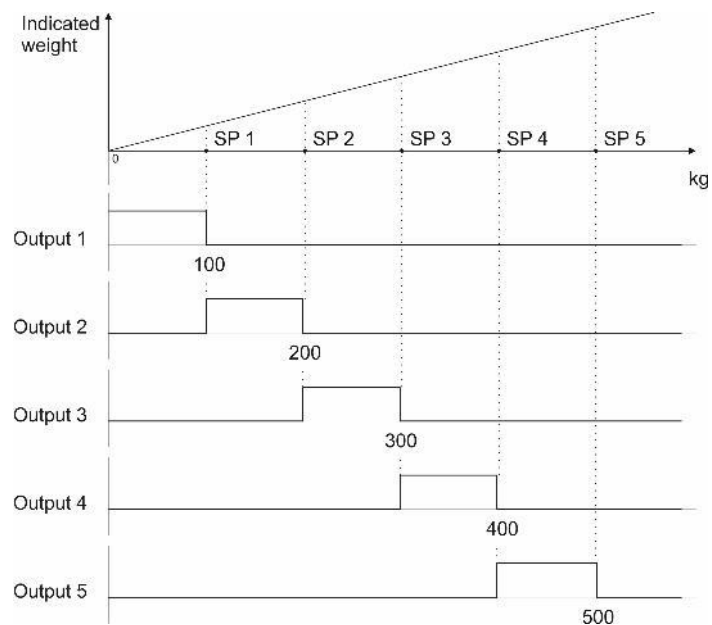
The digital outputs are activated as shown below, if the setpoints are set up to Control mode 1 and their values are entered in sequence. The outputs are activated with the set values and disabled with the following output value as shown in the drawing below.



*Note: Non-used digital outputs can be programmed freely. For example, if SP5 is not needed to control the process it can be set up to zero range to get empty signal.*

### SPC2 Control mode-2

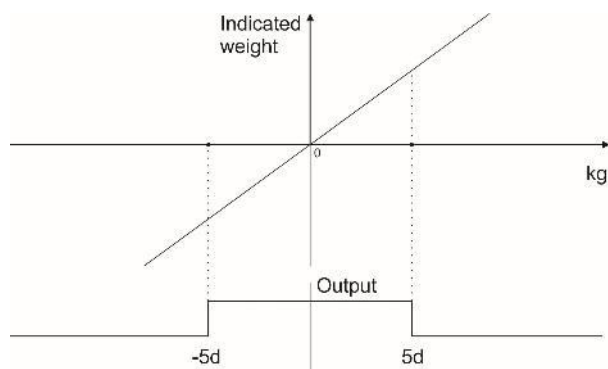
The digital outputs are activated as shown below, if setpoints are set up to Control mode-2 and their values are entered in sequence.



*Note: Non-used digital outputs can be programmed freely. For example, if SP5 is not needed to control process it can be set up to zero range to get empty signal.*

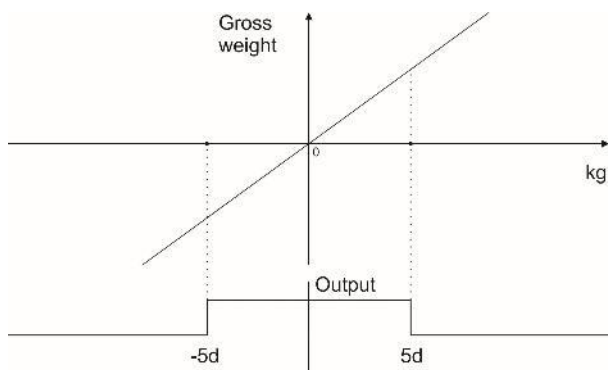
### ZR I Zero range of the indicated weight

The digital output is activated if the absolute indicated weight value is in the zero range. Refer to **parameter 356** to enter zero range value.



### ZR G Zero range of the indicated weight

The digital output is activated if the gross weight value is in the zero range. Refer to **parameter 356** to enter zero range value.



### Stabile

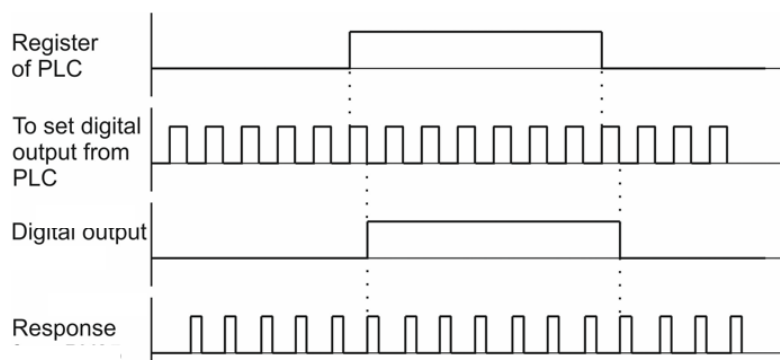
The digital output is activated when the displayed weight value is stable.

### Error





The digital output is activated when any Error is displayed on the display.

### Remote Output of the PLC via fieldbus or BSI










The digital output(s) can be controlled from PLC as a Remote output if the instrument is equipped with any fieldbus option. Refer to related fieldbus command table to activate or deactivate the outputs. This usage is independent from the weighing process of the instrument.







## The limit values entry at basic weighing

1. Press the  key for more than 2 seconds.
2. The setpoint 1 value appears on the display as value is shown on the display [SP 1 1250 kg].
3. Enter the new value by numerical keys. You may press  key to enter negative limit value.  
Press the  key to save it and to go to the next setpoint.
4. Repeat from step 2 for entering following setpoints.
5. The indicator returns to the operation after displaying setpoint 5 and entering its value,
6. Press  key to return operation at any step.

## Setpoint entry into SET memory

1. Press  key for more than 2 seconds. [ MEMORY ] prompt appears.
2. Press  key. The last used Set memory group number appears as [ SET : 111 ].
3. Enter the new memory code by pressing the numerical keys and press  key to enter in to the item.
4. The first limit value is shown on the display as [ SET 111 - SP1 ] [ 10.00 kg ]. Enter the new value by numerical keys and press the  key.
5. The following limit value appears as [ SET 111 - SP2 ] [ 20.00 kg ]. Enter new value by numerical keys and press the  key.
6. Repeat step 4 and 5 until all limit values of the three groups have been entered. After entering of the 5th setpoint value press  key to check all values again.
7. Or press  key to increase the memory code.
8. Or press  key to decrease the memory code.
9. Or press  key to exit.

## Select limits of item from SET memory

1. Press  key for more than 2 seconds. The last used setpoint value appears on the display as [ SP1 1250 kg ].
2. Press  key. The last used Set memory code appears on the display [ SET : 111 ].
3. Enter the memory code of the item by pressing the numerical keys and press  key.
4. The selected Set memory data will be loaded after displaying values.
5. Or press  key to exit without putting them in to the use.

## Limit values at SmartAPP

Digital inputs and outputs are set to their application related functions automatically if any SmartAPP operation have been programmed. The non-used inputs and outputs of the selected SmartAPP application can be programmed to any function described above.

For example, the Output 5 of Filling is not used by the Filling application software and it can be used as zero range output to check the scale unloading.

Refer to SmartAPP section, page 88, for usage of digital inputs and outputs details.

## 10.2 Basic Weighing

Digital inputs and outputs are set to their functions in sub-blocks 35- and 36- at basic weighing operation. Digital inputs can be programmed for zeroing, taring, printing etc. in sub-block 35-. Digital outputs can be programmed for the diverse functions as described below.

In / Out	Descriptions	Related parameter
Input 1	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, Fieldbus input	351
Input 2	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, Fieldbus input	352
Input 3	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, Fieldbus input	353
Input 4	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, Fieldbus input	354
Output 1	Setpoint1, Zero Range, Stable, Error, Fieldbus output	361
Output 2	Setpoint2, Zero Range, Stable, Error, Fieldbus output	362
Output 3	Setpoint3, Zero Range, Stable, Error, Fieldbus output	363
Output 4	Setpoint4, Zero Range, Stable, Error, Fieldbus output	364
Output 5	Setpoint5, Zero Range, Stable, Error, Fieldbus output	365

The outputs can be programmed as free setpoints of absolute indicated weight (SPAI), free setpoint of indicated weight (SPI), free setpoint of gross weight (SPG) or control output (SPC).

**IMPORTANT NOTE:** The names for items feature is valid for FT-112 with the firmware v01.09 / FT-112D v01.07 and higher.

## 10.3 Application Weighing

This weighing terminal may be equipped with 5 programmable setpoints to use them in basic weighing or in an application. If the specified set point values exceed or drop below, digital outputs are set, e.g., for controlling flaps, valves, lights etc. Digital outputs can be set to the classifying, checkweighing or filling application automatically if the application is programmed with **parameter 311**.

In / Out	Weighing/PCS	Classifying	Checkweighing	Filling
Input 1	Parameter 351	Start	Start	Start
Input 2	Parameter 352	Reset	Reset	Reset
Input 3	Parameter 353	Parameter 353	Parameter 353	Parameter 353
Input 4	Parameter 354	Parameter 354	Parameter 354	Parameter 354
Output 1	Parameter 361	- - Tolerance	- Tolerance	Ready
Output 2	Parameter 362	- Tolerance	OK	Fine
Output 3	Parameter 363	OK	+ Tolerance	Coarse
Output 4	Parameter 364	+ Tolerance	Parameter 364	End of Filling
Output 5	Parameter 365	+ + Tolerance	Parameter 365	Parameter 365

The setpoint entry menu is called up by pressing the  key for longer than 2 seconds. Additionally, one of the function keys can be programmed to access setpoint entry menu easily for frequent use.



# 11 SMARTAPP

*APPLICATION: Checkweighing, classifying and filling.*

*RELATED PARAMETERS: Sub-blocks 31- and 32-. Parameters 241, 242 or 243.*

SmartAPP is a special function which helps the operator to follow the weighing results on the analog bar and guides him by changing the display color in the application. The SmartAPP operation can be programmed for various weighing applications: filling, classifying or checkweighing.

At SmartAPP operation

1. The display background color changes to facilitate the use. For example, the background color changes automatically to red, green or yellow to indicate "too light", "in tolerance" or "too heavy" at classifying.
2. The operator may follow the product weight deviation from target on the bar graph.
3. The digital inputs and outputs are set to the programmed application automatically. You can control lights, flaps, diverters or valves with SmartAPP digital output signals. Refer to **page 80**.

## SmartAPP usage in piece counting

The SmartAPP applications can be used for piece counting. Limit values should be entered as quantity instead of weights. The exceptions are weight related values like zero range, tare, empty range etc.

Piece counting has its Set values entry and SET memory which are accessible in piece counting operation.

## Warning with display colour

The weighing terminal warns the operator by changing the display colours at SmartAPP operation. This feature provides the ability to operate with display colours if the exact numeric weights are not needed. Refer to **page 57**.

## Accoustic warning

The weighing terminal warns you at SmartAPP operation. You may select the acoustic warning type in the set up. Refer to **page 57**.

## Digital inputs and outputs

If one of the SmartAPP applications is selected, digital inputs and outputs are set according to the application automatically even if they are programmed to the diverse functions. Digital inputs and outputs may change their status immediately or if the weight is stable. Refer to **page 58**.



# 12 STANDARD APPLICATIONS

## 12.1 Piece Counting




**APPLICATION:** Piece counting can be done by sampling or by entering the average piece weight (APW) of the material. The checkweighing and classifying applications can be activated in piece counting for easy usage. The weight display indicates the quantity at piece counting.

**IMPORTANT NOTE:** If you wish to enter the average piece weight manually or if you wish to record APW values in to the APW memory, the second function key should be programmed for APW entry which is APW at **parameter 242**.

**RELATED PARAMETERS:** *Parameters 241 and 242.*

FT-112 indicator has several powerful features in counting/weighing as described in this section. Use the  key for piece counting, and  key for APW (average piece weight) entry (**page 55**). If APW entry will be done or APW memory will be used.

### Start piece counting

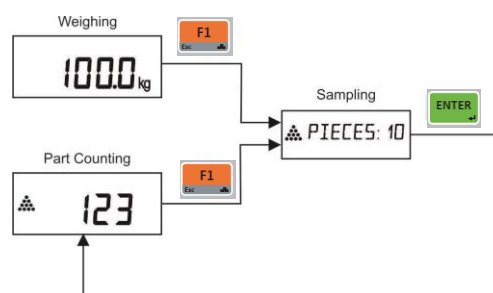
1. Press  key to enter piece counting operation. The last used average piece weight (APW) value is valid in counting.
2. Or press  key for more than 2 seconds to start piece counting from sampling.
3. Or press  key to start from average piece weight entry.

### Exit from piece counting



Press  key.

### Sampling


The scale counts the pieces on it by using the calculated average piece weight (APW) of the item. In sampling, FT-112 measures a certain number of the piece's total weight in very high resolution and divides it by the number of pieces (the so-called sampling quantity) to find average piece weight (APW). Based on this calculated average piece weight, counting can then be carried out. The accuracy of the piece counting is depending on the APW accuracy which can be calculated by a sampling with high quantity.



Sampling should be done very carefully for correct counting.

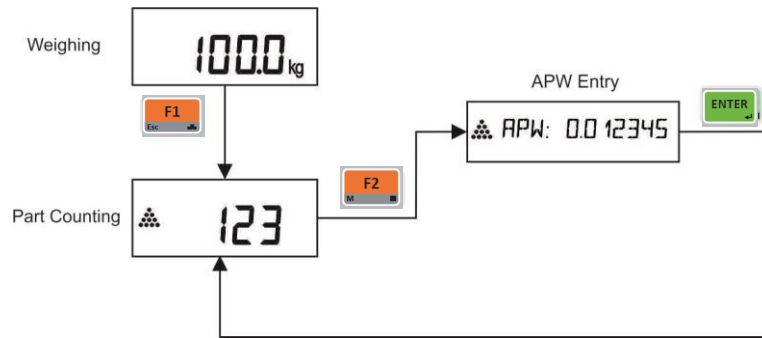
1. Empty the scale and press  key until  $\gt 0 \lt$  symbol appears on the display.
2. Press  key longer than a second until [ PIECES : ] and the sampling quantity [ 10 ] appears on the display.
3. Load the scale with counted items for sampling.
4. Enter the sampling quantity by pressing numerical keys.





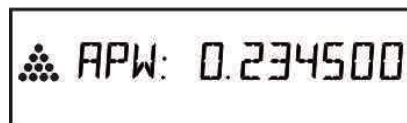
5. Press  to start sampling.
6. [ SAMPLING... ] message will be shown on the display.
7. [ APW : 0.012345 ] appears for a short time after sampling process and returns to piece counting mode with this APW.




## Piece counting with APW entry

The scale counts the pieces on it by entering the average piece weight (APW) by keys of the item. Entry of the APW of the possible higher quantity samples gives the better result during counting.





1. Empty the scale and press  key until  $\gt 0<$  symbol appears on the display.
2. Press  key. [ APW : 1.2345678 ] appears. The last used APW value will be shown.
3. Press numerical keys to enter new APW value.





4. Press  to start sampling.
5. Press  key to change the APW.
6. Press  key to exit weighing.


## Counting without a container

1. Press the  key,  $\gt 0<$  sign should appear after unloading the scale after sampling. Press the  key to enter the APW or call the APW of the material from APW memory. The last used APW can be used for the following piece counting, if you did not change it.
2. Place the batch of the material on the weighing scale,
3. Display will show the material quantity on the scale.





4. If you want to accumulate the sequential counting, press  key (refer to [page 31, 32](#)).
5. To return to the weighing mode, press  key.






## Counting pieces into a container

1. For counting into a container, place an empty container on the scale and tare with the  key. After taring the scale **>0<** sign should appear on the display.
2. Place batch of the material into the container.
3. Display will show the material quantity on the scale.

### NOTES:

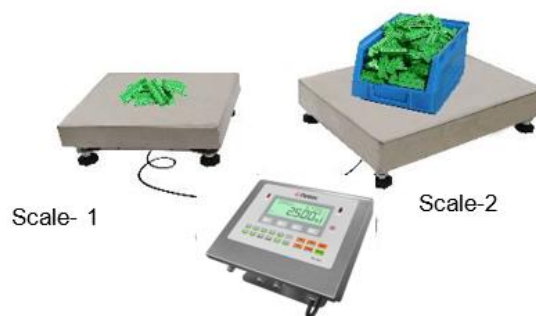
1. If the automatic taring function is active, you don't need to press the  key, because the scale is taring automatically as soon as the container is placed on the weighing scale.
2. If you know the tare weight, you may count the material in the container by entering the specific tare weight value, e.g.  entry by numerical keys, from memory or from barcode etc.

## Counting pieces out of a container

1. Place the **full** container on the weighing scale and then press the  key to tare the scale. The **>0<** sign should appear.
2. Press the  key to enter the piece counting mode
3. If needed, perform sampling as:
  - a. Press the  key for more than one second until sampling quantity appears
  - b. Change the sampling quantity using the numerical keys
  - c. Remove the sampling quantity of pieces from the weighing container and then press the  key for sampling.
  - d. The scale starts to count by displaying the number of pieces after sampling with a minus sign  
Or select the item APW from APW memory (*Page 93*)
4. Remove an amount of pieces from the container
5. The scale displays the number of pieces removed with a minus sign
6. Press  key for the following counting.

Press  key to enter the basic weighing operation.

## Counting with 2 scales



If the indicator is connected to 2 platforms, both scales can be used for sampling and counting. In case of scale-1 is used for sampling (reference) and Scale-2 is used for counting

1. Select Scale-1 and place the samples on its platform after zeroing the scale.
2. Apply sampling to Scale-1 for calculated APW as described above.
3. Select Scale-2 for counting item and place the item on the platform after zeroing.
4. Read the quantity of the items on the display.

## APW optimization

Sampling of a higher quantity provides a more accurate result, although the high quantity is not simple to count by hand. APW optimization is highly recommended for faster counting in high quantity sampling for more accurate piece counting, especially for entering APW values in to the APW memory.

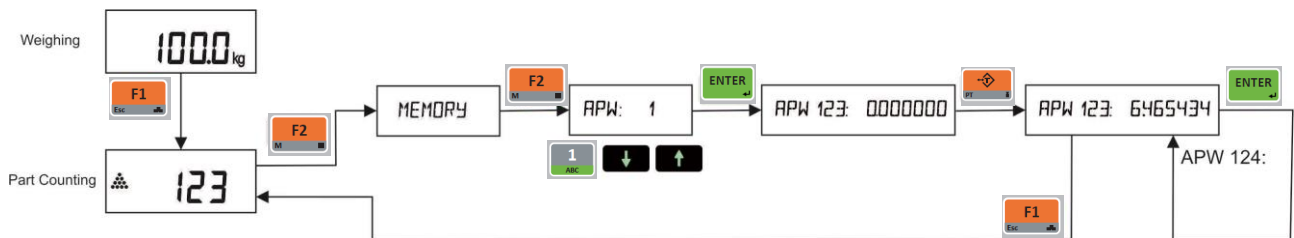
Please follow the procedure below for APW optimization;

1. First count low quantity, for example 10 pcs and sample with 10 pcs.
2. Add the same quantity again. For example, count 20 pcs on the scale and sample with 20 pcs.
3. Count 50 pcs on the scale and sample with 50 pcs.
4. Count 100 pcs on the scale and sample with 100 pcs, if you need high sampling accuracy.

After each APW optimization, piece counting accuracy will increase due to more accurate APW calculation statistically.

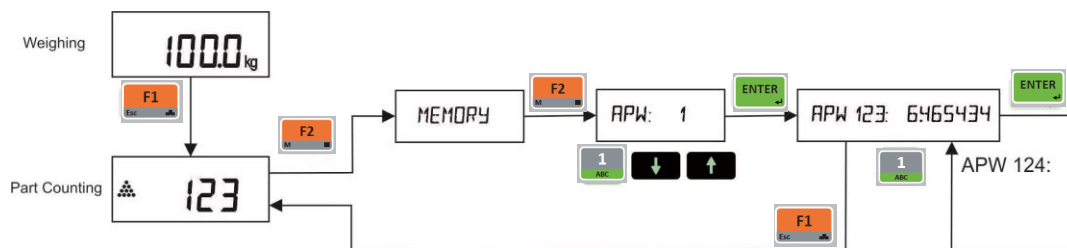
## APW recording to the memory after sampling

Up to 500 average piece weights (APW) of the varied materials can be saved in to the APW memory.



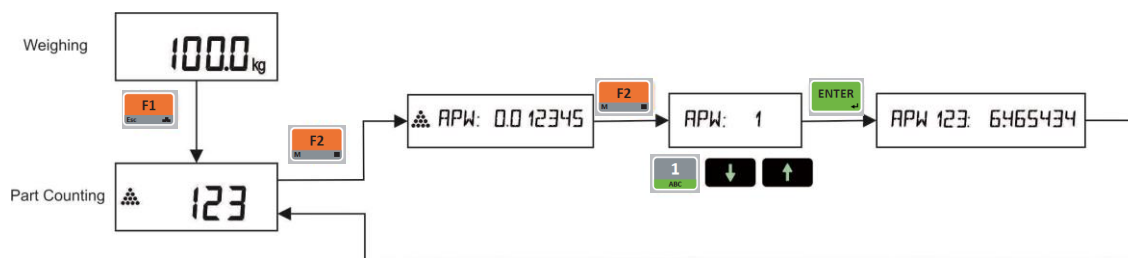
1. Press key for more than one second to enter memory in pieces counting.
2. Press key to enter APW memory. [ APW: 001 ] prompt appears.
3. Enter APW memory code by pressing numeric keys and press . Prompt appears to indicate the memory code and the old APW value.
4. Press key for saving the current APW value in this memory code which is [APW 123: 6.465434 ].
5. Press key to record the APW value in this memory.
6. Press key to exit piece counting.

## Enter Average Piece Weight numerically into the memory.



1. Press key for more than one second to enter memory in piece counting.
2. Press key to enter APW memory. [ APW: 001 ] prompt appears.
3. Enter APW memory code by pressing numeric keys and press key. The old APW value appears on the display [APW 123: 6.465434 ].
4. Enter new APW value by pressing numeric keys.
5. Press key to record the APW value in this memory.
6. Press key to exit piece counting.

## Select item from memory



1. Press key in counting mode to enter APW operation. The current APW value [ APW : 0.012345 ] prompt appears.
2. Press key to enter the APW memory. The last used APW memory code appears on the display as [ APW : 1 ].
3. Enter the memory code of the item by pressing the numeric keys and press key.
4. The APW value of the item will be loaded.
5. Or press key to exit without selecting the APW from memory.

## Totalization at pieces counting

1. Press key when the quantity is displayed and the scale is stable. [ C 01 MR: 1234 ] prompt indicates the accumulation number and total quantity.
2. Place another batch of items on the scale and press key to add the quantity to the total [ C 02 MR: 2468 ].
3. Further quantities can be added to the memory by pressing key.

## Displaying total quantity

The total quantity can be viewed by pressing key. Press key to leave the operation or the instrument will automatically leave after 15 seconds.

## Printing total quantity

The total quantity can be printed by pressing the key when the total value is displayed. The instrument returns to the piece counting operation after print out.

## Delete total quantity

To delete the total, press key while the total is displayed. Confirm [ Delete ? ] prompt by pressing key or press key to return to the operation without deleting the total.

## 12.2 Classifying

**APPLICATION:** To evaluate test samples with 5 limits as *too light -T2, light -T1, In Tolerance, heavy +T1 or too heavy +T2*, based on a target weight, and specified limit values. The weight display indicates the weight value.

**IMPORTANT NOTE:** If you need 3 limits instead of 5 limits, enter the same values in the 2 highest limits and in the 2 lowest limits as minimum and maximum limits sequentially.

**RELATED PARAMETERS:** Sub-blocks 31- and 32-. **Parameters 241, 242 or 243.**

Classifying is used for sorting products in to 6 ranges. Classifying can be programmed to start an operation automatically or on demand. Automatic operation starts if the load is heavier than Empty range. The demand operation starts by pressing the key or by digital input. The scale is empty if the weight is in the Empty range.

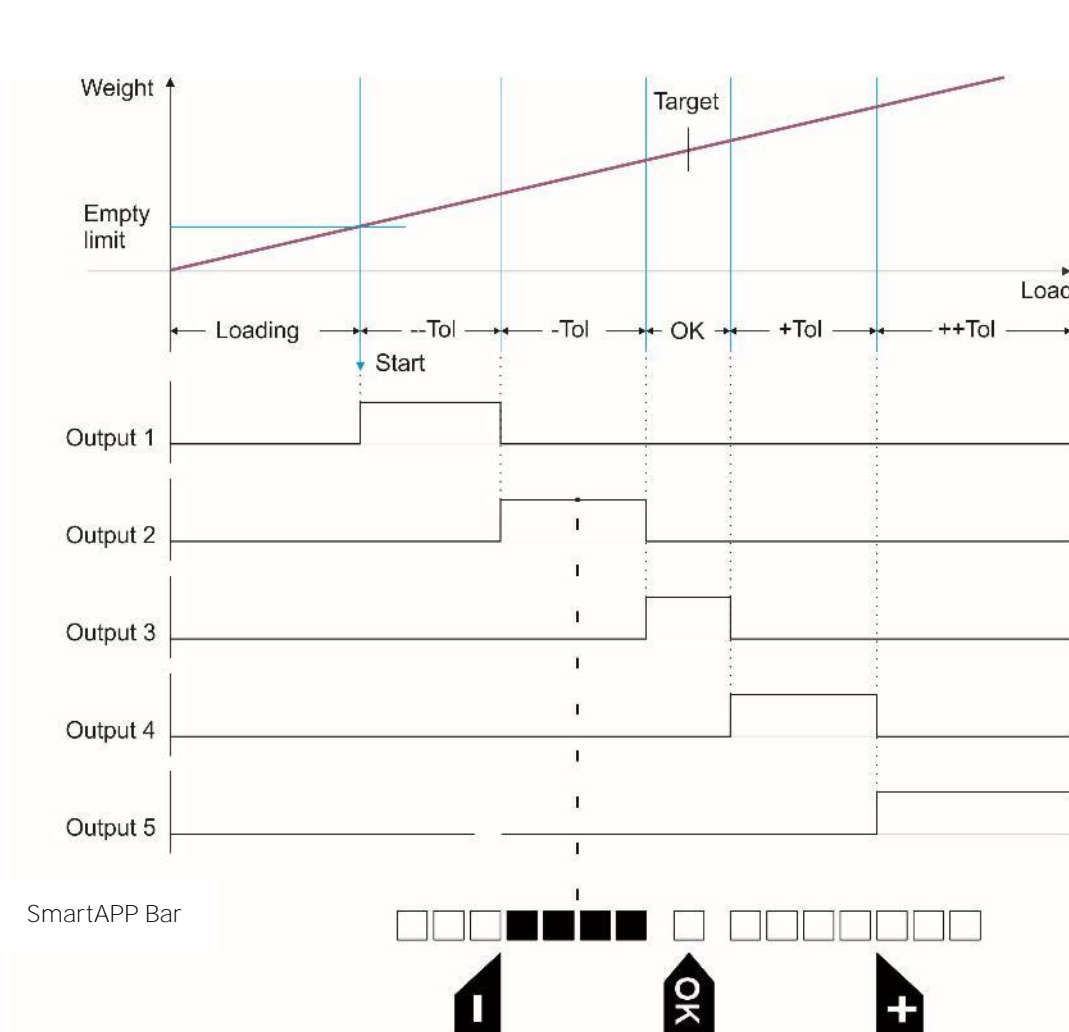


Figure 12.1 - Timing diagram of automatic classifying operation.

## Product Limit values at Classifying












The entry type can be selected as a weight value, deviation from target or percentage of the target, **parameter 312**. This selection defines the set values' entry names as shown below;

Entry type	Target	Lowest Limit -T2	Low limit -T1	High limit +T1	Highest Limit +T2	Unloaded scale limit
Value	TARGET	-- LOW	-LOW	+HIGH	++HIGH	EMPTY
Deviation	TARGET	-- TOL	-TOL	+TOL	++TOL	EMPTY
Percent %	TARGET	-- TOL	-TOL	+TOL	++TOL	EMPTY











The target (nominal value), low, high and empty range entries should be entered as weight values in units; Tolerance entries should be entered as deviation from nominal weight in unit or in percentage.

The descriptions below are considered the value entry type. Follow the equivalent method for entry types deviation or percentage.

### Entry the nominal value and limits by keys





1. Press the  key for more than 2 seconds.
2. The current target value appears on the display as [ TARGET 1250 kg ]. Enter the new value with numeric keys. Press the  key to save it or press  key to return to operation without saving.
3. The lowest tolerance prompt [ --LOW : 1234.6 ] will show you the current value. Enter a new value with numeric keys. Press the  key to save it or press  key to return to operation without saving.
4. The [ -LOW: 1245.6 ] prompt will show you the current low tolerance. Enter a new value with numeric keys. Press the  key to save it or press  key to return to operation without saving.
5. The [ +HIGH: 1255.6 ] prompt will show you the current high tolerance. Enter a new value with numeric keys. Press the  key to save it or press  key to return to operation without saving.
6. The [ ++HIGH: 1260.0 ] prompt will show you the current highest tolerance. Enter a new value with numeric keys.
7. The [ EMPTY : 100,0 ] prompt will show you the current empty range of the platform. Enter a new value with numeric keys.
8. Press the  key to return to the operation after saving the entry or press  key to return to the operation without saving.

### Entry product limits into SET memory

1. Press  key for more than 2 seconds. [ MEMORY ] prompt appears.
2. Press  key. The last used Set memory code appears [ SET :001 ].
3. Enter the new memory code by pressing the numeric keys and press  key.
4. The target value is shown on the display as [ SET 001: TARGET ], [ 1250 kg ]. Enter the new target with numeric keys and press the  key.
5. The lowest tolerance prompt [ --LOW : 1234.6 ] appears. Enter a new value with numeric keys and press the  key.
6. The low tolerance prompt [ -LOW : 1245.6 ] appears. Enter a new value with numeric keys and press the  key.
7. The high tolerance prompt [ +HIGH : 1255.6 ] appears. Enter a new value with numeric keys and press the  key.
8. The highest tolerance prompt [ ++HIGH : 1260.0 ] appears. Enter a new value with numeric keys and press the  key.
9. The [ EMPTY : 100,0 ] prompt appears on the display. Enter a new value with numeric keys.
10. Press the  key to go to the following memory after save, or press  key to return to the operation without saving.



## Select product limits from SET memory

1. Press  key for more than 2 seconds. The current target value appears on the display as TARGET: 1250 kg ].
2. Press  key to enter the Set memory. The last used Set memory code appears on the display as [ SET :001 ].
3. Enter the memory code of the product by pressing the numeric keys and press  key.
4. The selected product limits are loaded for use after displaying values.
5. Or press  key to exit without selecting the product from the memory.

## Start and Stop the Classifying

Follow one of the methods described below to start the classifying operation:

1. Function key: To start the classifying operation by simply pressing a key, program one of the function keys for smart operation (Refer to **parameter 241, 242 and 243**).
2. Digital input: The digital input-1 can be used to start the classifying operation.
3. Serial interface: Transmit "Start SmartAPP" command via serial interface (Refer to **parameter 111, 121, 131, 141 or 151**).
4. Automatic classifying operation: If you want to use the scale for classifying only and prefer to activate classifying operation automatically after loading, set the **parameter 321** to automatic operation.

## To end the classifying operation:

1. Unload the scale or,
2. Disable the operation by pressing the function key programmed as SmartAPP key or,
3. Reset the classifying with digital input-2 or,
4. Send the "Stop SmartAPP" command via serial interface.

## SmartAPP for Classifying

The SmartAPP displays if the load is in tolerance or not during classifying with backlight colors, with bar graph on the right of the display and acoustically. Backlight color changes automatically to indicate the classifying zone and to alert the operator.

The multicolor operation simplifies the use and can assist the operator to reduce mistakes. The weighing speed increases because of operators' faster and easy perception of colors.



Figure 12.2 - Weight display and toolbar at classifying.

## Digital inputs and outputs

If one of the applications is selected, digital inputs and outputs are defined for the application automatically even if they are programmed for the different functions.

You may control your scale via these digital inputs and outputs. Unused inputs and outputs of the application can be programmed freely as basic weighing.

Inputs / Outputs	Descriptions
Input-1	Start
Input-2	Reset
Input-3	Refer to <b>parameter 353</b>
Input-4	Refer to <b>parameter 354</b>
Output-1	-- Tolerance
Output-2	- Tolerance
Output-3	OK
Output-4	+ Tolerance
Output-5	++ Tolerance

Table 12.1- Digital inputs and outputs of Classifying

# 1.1 Checkweighing

**APPLICATION:** To compare the difference between the target and the actual weight. Determination of tolerances. The weight display indicates the difference value from target. The bar on the left indicates the deviation from the target.

**RELATED PARAMETERS:** Sub-blocks 31- and 32-. Parameters 241, 242 or 243.

Checkweighing operation is used to check the tolerances of the product weights. The checkweighing can be programmed to start the operation automatically or on demand. Automatic operation starts if the load is heavier than empty range. The operation starts by pressing the function key or by digital input. The scale is empty if the weight is in the Empty range.

The checkweighing operation is shown in diagram below

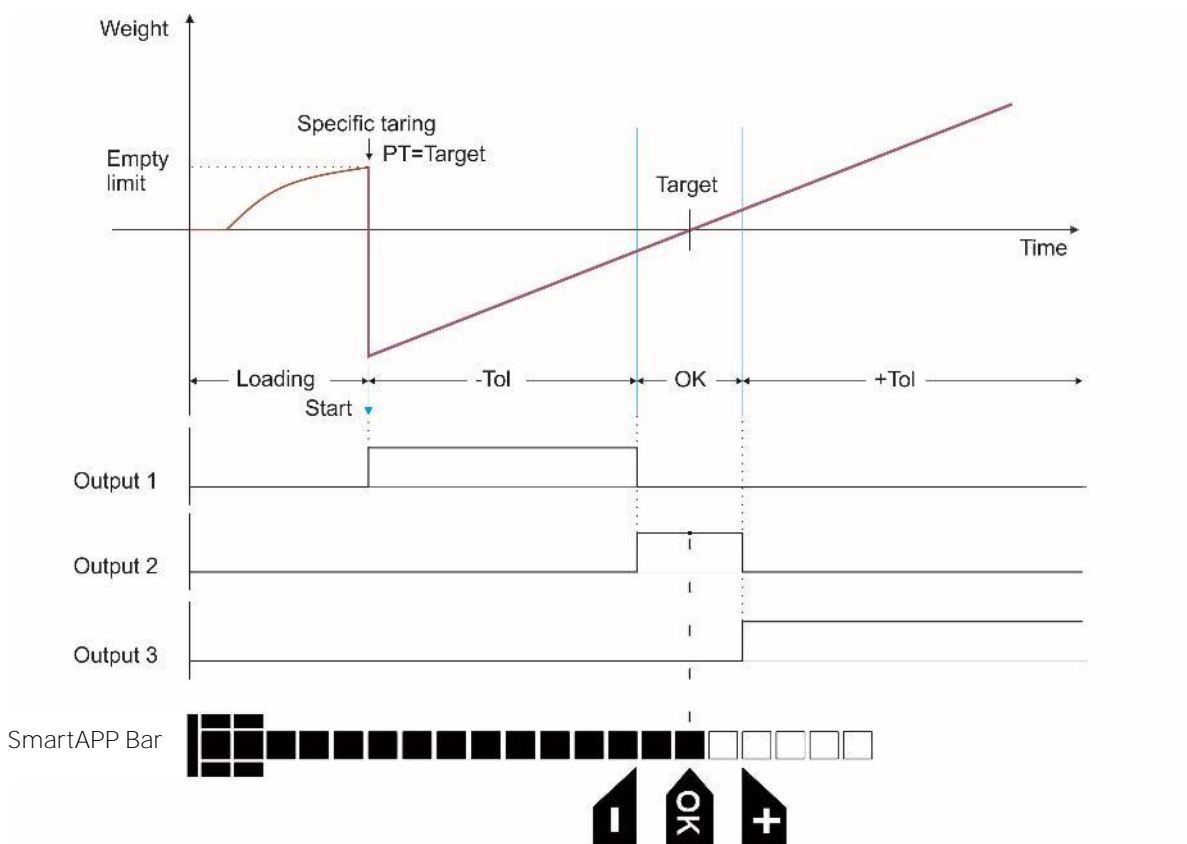


Figure 12.3 - Timing diagram of checkweighing operation.

## Product Limit values at Checkweighing










The entry type can be selected as a weight value, deviation from target or percentage of the target, **parameter 312**. This selection defines the set values entry names as shown below:

Entry type	Target	Low limit -T1	High limit +T1	Unloaded scale limit
Value	TARGET	-LOW	+HIGH	EMPTY
Deviation	TARGET	-TOL	+TOL	EMPTY
Percent %	TARGET	-TOL	+TOL	EMPTY









The target (nominal value), low, high and empty range entries should be entered as weight values in the scale; Tolerance entries should be entered as deviation from nominal weight in units or in percentage.

The descriptions below are considered the value entry type. Follow the same way for entry types deviation or percentage.





### Entry of the nominal value and limits using input keys

1. Press the  key for more than 2 seconds.
2. The current target value appears on the display as [ TARGET 1250 kg ]. Enter the new value with numeric keys. Press the  key to save it or press  key to return to normal operation without saving.
3. The [ -LOW : 1245.6 ] prompt shows the current low tolerance. Enter new value with numeric keys. Press the  key to save it or press  key to return to normal operation without saving.
4. The [ +HIGH : 1255.6 ] prompt shows the current high tolerance. Enter new value with numeric keys. Press the  key to save it or press  key to return normal operation without saving.
5. The [ EMPTY : 100 ] prompt indicates the current empty range of the platform. Enter a new value with numeric keys.
6. Press the  key to return to operation after saving the entry or press  key to return to normal operation without saving.

### Entering product limits into the SET memory

1. Press  key for more than 2 seconds. [ MEMORY ] prompt appears.
2. Press  key. The last used Set memory code appears [ SET :001 ].
3. Enter the new memory code by pressing the numeric keys and press  key.
4. The target value appears on the display as [ SET 001: TARGET ], [ 1250 kg ]. Enter the new target with numeric keys and press the  key.
5. The low tolerance prompt [ -LOW : 1245.6 ] appears. Enter a new value with numeric keys and press the  key.
6. The high tolerance prompt [ +HIGH : 1255.6 ] appears. Enter a new value with numeric keys and press the  key.
7. The [ EMPTY : 100,0 ] prompt appears on the display. Enter a new value with numeric keys.
8. Press the  key to go to the next memory after saving or press  key to return to normal operation without saving.

### Select product limits from SET memory

1. Press  key for more than 2 seconds. The current target value appears on the display as [ TARGET: 1250 kg ].
2. Press  key to enter Set memory. The last used Set memory code appears on the display as [ SET :001 ].
3. Enter the memory code of the product by pressing the numeric keys and press  key.
4. The selected product limits are loaded for usage after displaying values.
5. Or press  key to exit without selecting the product from memory.

## Start and Stop the Checkweighing

Follow one of the ways described below to start the checkweighing operation

1. Function key: To Start the checkweighing operation by pressing a key, program one of the function keys for smart operation (Refer to **parameter 241, 242 and 243**).
2. Digital input: The digital input-1 can be used to start the checkweighing operation.
3. Serial interface: Transmit "Start SmartAPP" command via serial interface (Ref. to **parameter 113**)
4. Automatic checkweighing operation: If the scale will only be used for checkweighing and you prefer to activate checkweighing operation automatically after loading, set the **parameter 321** to automatic operation.

To end the checkweighing operation

1. Unload the scale or,
2. Disable the operation by pressing the function key programmed as the SmartAPP key or,
3. Reset the checkweighing with digital input-2 or,
4. Send the "Stop SmartAPP" command via serial interface.

## SmartAPP for Checkweighing

The SmartAPP displays if the load is in tolerance or not during checkweighing using backlight colors, with bar graph on the right of the display and acoustically. The backlight colors automatically change to indicate the checkweighing zone, and to warn the operator.

The multicolor operation simplifies the operation of the scale and helps the operator to reduce mistakes. The weighing speed is increased due to the operators' faster and easy perception of colors.

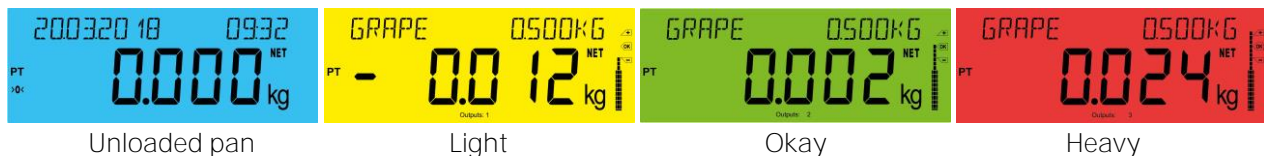


Figure 12.4 - Weight display and toolbar at checkweighing.

## Digital inputs and outputs

If one of the applications is selected, digital inputs and outputs are set to the application automatically even they are programmed to different functions.

The scale can be controlled by these digital inputs and outputs. Non-used inputs and outputs of the application can be freely programmed for basic weighing.

Inputs / Outputs	Descriptions
Input-1	Start
Input-2	Reset
Input-3	Refer to <b>parameter 353</b>
Input-4	Refer to <b>parameter 354</b>
Output-1	- Tolerance (light)
Output-2	OK
Output-3	+ Tolerance (heavy)
Output-4	Refer to <b>parameter 364</b>
Output-5	Refer to <b>parameter 365</b>

Table 12.2 - Digital inputs and outputs of Checkweighing.

## 1.2 Filling

**APPLICATION:** For weighing to a target value with tolerance control. The weight display indicates the weight value.

**RELATED PARAMETERS:** Sub-blocks 31- and 32-. Parameters 241, 242 or 243.

Application parameter

Automatic taring page 29, Parameters 232, 518

Filling is used for weighing of materials into a container. The scale accepts the load if the gross weight is greater than the empty range.

The Filling operation is shown in the diagram below.

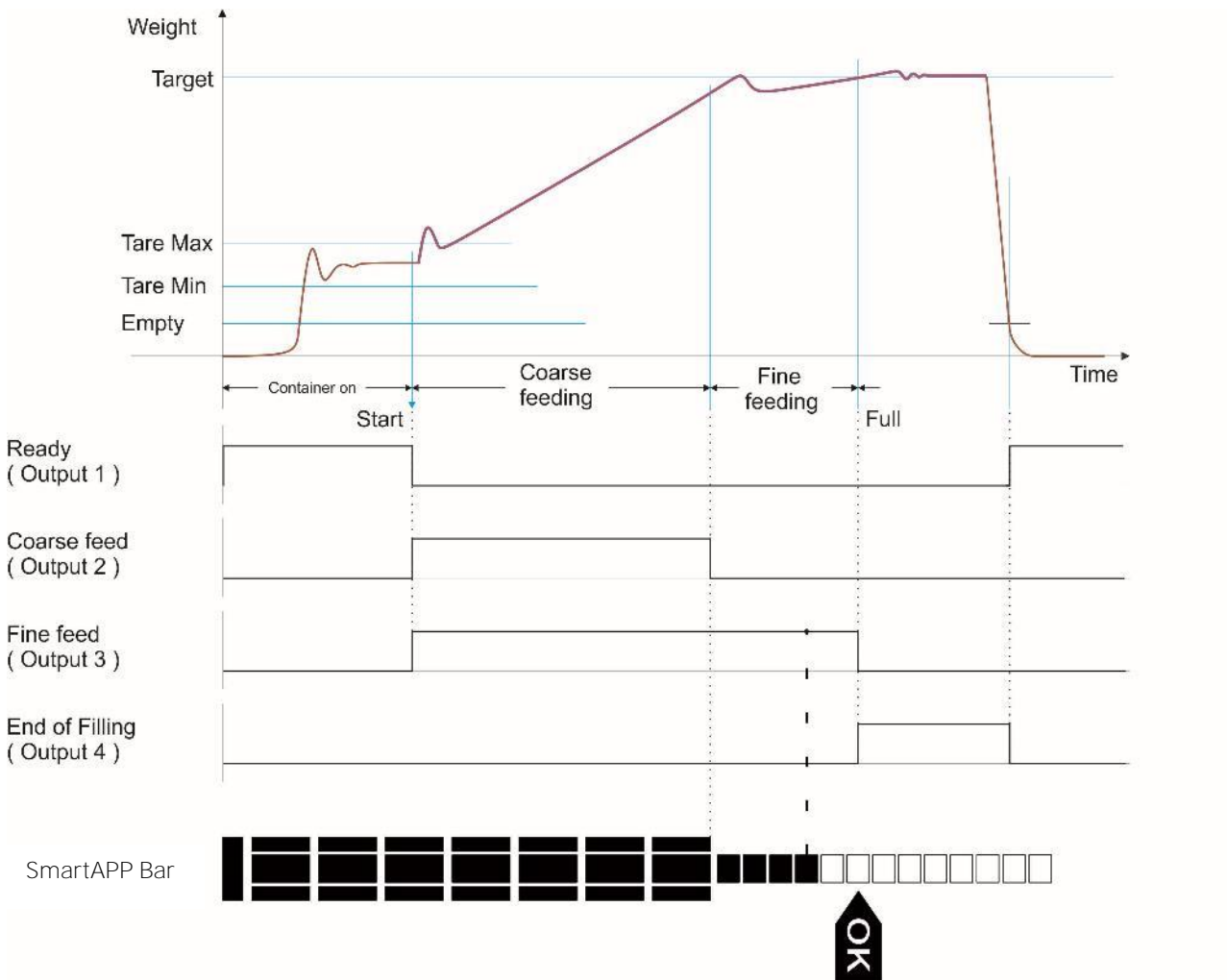


Figure 12.5 - Timing diagram of filling operation.

## Product entries for filling

Product entries for filling are;

Entry type	Target	Coarse Feeding	Fine feeding	Tare minimum	Tare maximum	Unloaded scale limit
Value	TARGET	COARSE	FINE	TAREMIN	TAREMAX	EMPTY
Deviation	TARGET	COARSE	FINE	TAREMIN	TAREMAX	EMPTY
Percent %	TARGET	COARSE	FINE	TAREMIN	TAREMAX	EMPTY

TARGET: The Nominal weight to be filled,

COARSE: Coarse cut off value relevant to Nominal value or  
Coarse = Nominal Value - Course cut off deviation and ratio,

FINE: Fine cut off value relevant to Nominal value or  
Fine = Nominal Value - Fine cut off before Nominal value indicates deviation and ratio,

TAREMIN: Tare weight minimum,

TAREMAX: Tare weight maximum,

EMPTY: The range which the scale is accepted as unloaded. (Zero zone)














Example: If you fill 1000 g into a container at deviation entry type, container weight is between 150g and 190 g, the coarse feeding is set up to 900 g and fine feeding is set up to 980 g;

Enter the Following:







Target = 1000g, Coarse= 100g, Fine = 20g, Taremin= 150g and Taremax = 190g. Tare value might be 100g.









If the target increases to 1100g, changing of the coarse and fine feed cutoff values for deviation and ratio is not required.

## Entering the nominal value and limits with keys





1. Press the  key for more than 2 seconds.
2. The current target value appears on the display as [ TARGET: 1000g ]. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
3. The current pre-act value appears [ COARSE : 100g ]. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
4. The current fine feed pre-act value appears [ FINE : 20g ]. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
5. The minimum tare weight appears [ TAREMIN : 150g ]. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
6. The maximum tare weight is shown as [ TAREMAX : 190g ]. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
7. The [ EMPTY : 100g ] prompt indicates the current empty range of the platform. Enter a new value with numeric keys.
8. Press the  key to return to normal operation after saving or press  key to leave without saving the new empty range.

## Record the product into the SET memory

1. Press  key for more than 2 seconds. [ MEMORY ] prompt appears.
2. Press  key. The last used Set memory code appears [ SET :001 ].
3. Enter a new memory code by pressing the numerical keys and press  key.
4. The previous target value appears on the display as [ SET 001: TARGET ], [ 5.00 kg ]. Enter the new value with numeric keys and press the  key.
5. The [ COARSE : 1,80 ] prompt appears on the display. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.

6. The [ FINE : 0,20 ] prompt appears on the display. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
7. The [ TAREMIN : 0,60 ] prompt appears on the display. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
8. The [ TAREMAX : 1,20 ] prompt appears on the display. Enter a new value with numeric keys. Press the  key to save or press  key to leave without saving.
9. The [ EMPTY : 1,00 ] prompt appears on the display. Enter a new value with numeric keys.
10. Press the  key to enter the following memory after save or press  key to leave without saving.

## Select product from SET memory

1. Press  key for more than 2 seconds. The current target value appears on the display as [ TARGET: 1250 kg ].
2. Press  key to enter Set memory. The last used Set memory code appears on the display as [ SET :001 ].
3. Enter the memory code of the product by pressing the numeric keys and press  key.
4. The selected product limits are loaded for use after displaying the values.
5. Or press  key to exit without saving.

## Start and Stop the filling

One of the following ways can be used to start the filling operation;

1. Function key: To start the Filling operation by pressing a key, program one of the function keys for SmartAPP (Refer to **parameter 241, 242 and 243**).
2. Digital input: The digital input-1 can be used to start the filling operation.
3. Serial interface: Transmit "Start SmartAPP" command via serial interface (Refer to **parameter 111, 121 131 141 or**).
4. To only use the scale for Filling and prefer to activate Filling operation automatically after loading, set the **parameter 321** to automatic filling operation.

## To end the filling

1. Unload the platform,
2. Disable the operation by pressing the function key which is programmed as SmartAPP key or.
3. Reset the filling with digital input-2 or,
4. Send the "Stop SmartAPP" command via serial interface.

## SmartAPP for filling

The SmartAPP displays the filling cycles with backlight colors, with bar on the right of the display and acoustically. Refer to parameter 315, page 57 to set up the SmartAPP.



Figure 12.6 - Weight display and toolbar at checkweighing.

## Digital inputs and outputs

If one of the applications is selected, digital inputs and outputs are assigned to the application automatically even they are programmed for the different functions.

You may control your scale via these digital inputs and outputs. Unused inputs and outputs of the application can be programmed freely for basic weighing.

Inputs / Outputs	Descriptions
Input-1	Start
Input-2	Reset
Input-3	Refer to parameter 353
Input-4	Refer to parameter 354
Output-1	Ready
Output-2	Fine
Output-3	Coarse
Output-4	End of Filling
Output-5	Refer to parameter 365

Table 12.3 - Digital inputs and outputs of filling.

## 12.3 Packing

**APPLICATION:** Especially used for packing the agricultural products manually, e.g., strawberry packing for markets.

**RELATED PARAMETERS:** Sub-blocks 31- and 32-. Parameters 234, 241, 242 or 243.

Packing mode is used to fill products into the containers for selling in the markets, like 500g strawberry pack. This operation can be performed in five ways using parameter 327;

### Gross weighing

1. The target weight is entered as total of net and tare weights, i.e., enter 520g if the net is 500g and tare is 20g.
2. Place the container on the scale.
3. The display colour changes to green if the weight is in tolerance.
4. Remove the container for the next weighing.

### Net weighing with autotare

1. The target weight is the nominal weight of the packing, i.e. enter 500g if the net packing weight is 500g.
2. Place the container on the scale.
3. The terminal automatically tares the load if stable.  
*IMPORTANT NOTE : Set motion and stability time for your application, par. 516 and 517.*
4. Put the product into the container
5. The display colour changes to green if the weight is in tolerance.
6. Remove the container for the next weighing.

### Net weighing with specific tare PT

1. The target weight is the nominal weight of the packing, i.e. enter 500g if the net packing weight is 500g. Enter the specific tare PT by pressing PT key ( page 30)
2. Place the container on the scale.
3. The terminal automatically tares the load with a specific tare
4. Put the product into the container.
5. The display colour changes to green if the weight is in tolerance.
6. Remove the container for the next weighing.



## Net weighing with takeaway from big container.

A big container is put on the scale and the system measures the weight removed from the container. For example, a 20kg product box is put on the scale for 500g packing in net:

1. The target weight is the nominal weight of the packing, i.e. enter 500g.
2. Place the box on the scale.
3. The scale automatically tares the load.  
*IMPORTANT NOTE: Set motion time and stability time for your application, par. 516 and 517.*
4. Remove the product from the box on the scale and place the container which is being packed.
5. The display colour changes to green if the weight removed is in tolerance.
6. After settling time in the tolerance range, the scale tares automatically for the next packing.

## Net weighing multi-container in a big case

This operation is to pack pre-packed containers into their carriage cases. The target weight is the nominal weight of the packing, i.e. enter 500g if the net packing weight is 500g.

1. Put the case on the scale.
2. The scale automatically tares the load.  
*IMPORTANT NOTE Set motion time and stability time for your application, par. 516 and 517.*
3. Put the product in to the first container.
4. The display colour changes to green if the weight is in tolerance.
5. The scale automatically tares the residual load.  
*IMPORTANT NOTE: Set motion time and stability time for your application, par. 516 and 517.*
6. Start to fill the next container.
7. The operation continues from item 4 to item 6 until the last container is filled.
8. Remove the case. The scale returns to gross weighing.

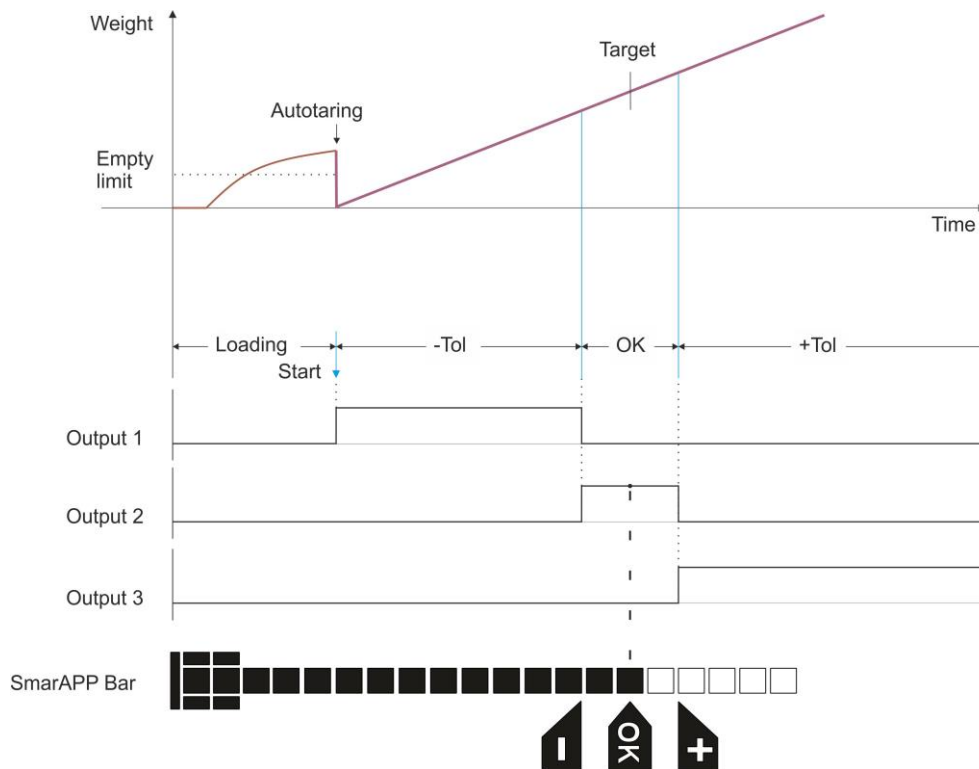


Figure 12.7 - Timing diagram of packing operation with autotaring.










## Product Limit values at Packing

The entry type can be selected as a weight value, deviation from target or percentage of the target, **parameter 312**. Entries are as:









Entry type	Target	Low limit	High limit	Unloaded scale limit to return gross
Value	TARGET	LOW	HIGH	EMPTY
Deviation	TARGET	-TOL	+TOL	EMPTY
Percent %	TARGET	-TOL%	+TOL%	EMPTY

The target (nominal value), low, high, specific tare and empty range entries should be entered the weight value in unit; Tolerance entries should be entered as deviation from nominal weight in unit or in percentage. The descriptions below are considered the value entry type. Follow the similar way for entry types of deviation or percentage.





### The nominal and limit values entry

1. Press the  key for more than 2 seconds.
2. The current target value is seen on the display as [ TARGET 1250.0 ]. Enter the new value with numerical keys. Press the  key to save it or press  key to return operation without saving.
3. The [ LOW : 245.6 ] prompt will show you the current low tolerance. Enter new value with numerical keys. Press the  key to save it or press  key to return operation without saving.
4. The [ HIGH : 255.6 ] prompt will show you the current high tolerance. Enter new value with numerical keys. Press the  key to save it or press  key to return operation without saving.
5. The [ EMPTY : 10.0 ] prompt indicates the current empty range of the platform. Enter new value with numerical keys.
6. Press the  key to return the operation after saving the entry or press  key to return operation without saving.

### Product record into SET memory

1. Press  key more than 2 seconds. [ MEMORY ] prompt appears.
2. Press  key. The last used Set memory code appears [ SET :001 ].
3. Enter the new memory code by pressing the numerical keys and press  key.
4. The target value is seen on the display as [ SET 001: TARGET ], [ 1250.0 ]. Enter the new target with numerical keys and press the  key.
5. The low tolerance prompt [ LOW : 245.6 ] appears. Enter new value with numerical keys and press the  key.
6. The high tolerance prompt [ HIGH : 255.6 ] appears. Enter new value with numerical keys and press the  key.
7. The [ EMPTY : 10,0 ] prompt appears on the display. Enter new value with numerical keys.
8. Press the  key to go to the following memory after save it or press  key to return operation without saving.

### Select product from SET memory

1. Press  key for more than 2 seconds. The current target value appears on the display as [ TARGET: 1250.0 ].
2. Press  key to enter Set memory. The last used Set memory code appears on the display as [ SET :001 ].
3. Enter the memory code of the product by pressing the numerical keys and press  key.
4. The selected product limits are loaded for usage after displaying values.
5. Or press  key to exit without selecting the product from memory.

## Start and Stop the Packing

Follow one of the ways described below to start the packing operation:

1. Function key: If you want to start the packing operation by pressing key, program one of the function key for smart operation (Refer to **parameter 241, 242 and 243** ).
2. Digital input: The digital input-1 can be used to start the packing operation.
3. Serial interface: Transmit "Start SmartAPP" command via serial interface (Refer to **parameter 111, 121, 131, 141 or 151**).
4. Automatic packing operation: If you will use the scale only for packing and you prefer to activate packing operation automatically after loading, set the **parameter 321** to automatic operation.

## To end the packing operation.

1. Unload the scale or,
2. Disable the operation by pressing the function key, which is programmed as SmartAPP key or,
3. Reset the packing with digital input-2 or,
4. Send the "Stop SmartAPP" command via serial interface.

## SmartAPP at Packing

The SmartAPP at packing announces the load is in tolerances or not with backlight color, with bar graph on the right side of the display and acoustically. The backlight color is changed automatically to indicate the packing zones, to warn the operator.

The multicolor backlight feature provides operational comfort and reduces operator mistake. The weighing speed increases because of operators' faster and easy perception of colors.

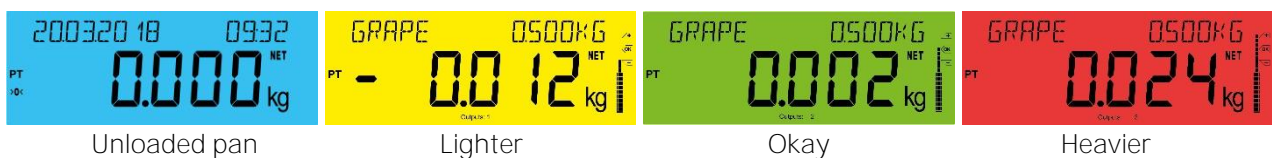


Figure 12.8 - Weight display and toolbar at packing

## Digital inputs and outputs

If one of the applications is selected, digital inputs and outputs are set according to the selected application requirements automatically, even they have been previously set to the different functions. You can control your scale via these digital inputs and outputs. Non-used inputs and outputs of the application can be programmed freely in the related parameter for any function or as a Remote IO of the PLC to control them via fieldbus.

Inputs / Outputs	Descriptions
Input-1	Start
Input-2	Reset
Input-3	Refer to parameter 353
Input-4	Refer to parameter 354
Output-1	- Tolerance ( lighter )
Output-2	OK
Output-3	+ Tolerance ( heavier )
Output-4	Refer to parameter 364
Output-5	Refer to parameter 365

Table 12-4 - Digital inputs and outputs of Packing.

# 13 RS232 AND RS485 DATA OUTPUTS

FT-112 indicator has 2 x RS 232, RS 485 and Ethernet interfaces. In this section, you will find the data structure of different type of the data outputs via these serial ports. If you transmit the ASCII codes: **P**(print), **Z**(zero), **T**(tare) or **C**(clear) letters to the serial port of FT-112; the indicator will act as if the related key is pressed. To select the scale, transmit ASCII code 1, 2 or S to the weighing terminal.

## 13.1 Continuous data output

Continuous data output of the instrument is transmitted in the following data structure. The serial ports of FT-112 are suitable for bi-directional communication.

CR (Carriage return) and LF (Line feed) codes can be enabled or disabled from response. CHK (Checksum) can be enabled or disabled from both commands and responses and only the continuous data output can be programmed for more than one interface.

The data format of continuous data output is;

	Status			Indicated						Tare								
STX	STA	STB	STC	D5	D4	D3	D2	D1	D0	D5	D4	D3	D2	D1	D0	CR	LF	CHK

The including of the status bytes STA, STB and STC are;

Definition Table for Status A ( STA )							Bit 5	Bit 6	Bit 7
Bits 0, 1 and 2			Bits 3 and 4						
0	1	2	Decimal point	3	4	Increment size	Always 1	Always 1	X
0	0	0	XXXXOO	1	0	X 1			
1	0	0	XXXXXO	0	1	X 2			
0	1	0	XXXXXX	1	1	X 5			
1	1	0	XXXXX.X						
0	0	1	XXXX.XX						
1	0	1	XXX.XXX						
0	1	1	XX.XXXX						
1	1	1	X.XXXXX						

Definition Table for Status B ( STB )		
Bit 0	0 = Gross	1 = Net
Bit 1	0 = Weight positive	1 = Weight negative
Bit 2	0 = No Error	1 = Error
Bit 3	0 = Stable	1 = Unstable
Bit 4	Always = 1	
Bit 5	Always = 1	
Bit 6	0 = Not power on zeroed	1 = Zeroed with power on zero
Bit 7	X	

Definition Table for Status C ( STC )		
Bit 0	Always 0	
Bit 1	Always 0	
Bit 2	Always 0	
Bit 3	Always 0	
Bit 4	Always 1	
Bit 5	Always 1	
Bit 6	Always 0	
Bit 7	X	

CHK (Checksum) = 0 - (STX + STATUS A + ..... + LF)

Error Messages: UNDER, OVER, A.OUT,L-VOLT and TILT are represented in Indicated data fields.

*Note: The weight data is represented with right aligned and the error messages are represented with left aligned..*

## 13.2 Fast continuous data output


Fast continuous “indicated weight” data output can be used only for the instruments which can communicate fast. The output rate is related with the baud rate. Use higher baud rate for faster data rate. CR and LF can be enabled in the related parameter.

The data format of the fast-continuous data output is;  
[STX][STATUS][SIGN][WEIGHT VALUE][CR][LF]

Examples:

☺S+000123.4	(weight is stable and 123.4)
☹D+000123.4	(weight is dynamic and 123.4)
☺M+000123.4	(Dynamic weighing result is 123.4)
☹-----	(Dynamic weighing in calculating)
☹+	(Over load)
☹-	(Under load)
☹O	(ADC out error)

## 13.3 Print mode

The format of the data output in Print mode can be selected in the sub-block 16-. Only one serial port can be programmed for printing. Print mode data outputs is sent by pressing the  key or by receiving ASCII P command via serial port.


### SINGLE LINE

You can transmit the printout data in single line format by pressing  key. This format is recommended to send the print data to a PC or to any host. The data output structure is;

12.02.2016 14:47 CN: 71 G: 3.007kg T: 1.001kg N: 2.006kg \*ALB: 5\*

DATE	TIME	ID1 Name	ID1 Data	ID2 Name	ID2 Data	CN	GROSS	PT or TARE	NET	ALB	C R	L F
10	3 5	3 Max. 16	3 Max. 32	3 Max. 16	3 Max. 32	3 9	3 13	3 13	3 13	3 12	1	1

## MULTI LINE

You can send the data in multiple line formats as shown in the label given below by pressing  key. The data output including can be programmed with printer parameters. The multiline data output can be programmed for 16-byte narrow printers and for others.

FLINTEC GmbH. www.flintec.com Meckesheim, Germany	Header	FLINTEC GmbH www.flintec.com Meckesheim, Germany
25.05.2022 09:16 CN           34	Date & Time	Date           25.05.2022 Time           09:16 CN           34
OPERATOR JOSEPH SMITH MATERIAL ASCORBIC ASID	Ticket no	OPERATOR JASMINE WHITE MATERIAL ROSE PARFUME
G           4.772 kg T           1.675 kg N           3.097 kg	Identifications	Gross           4.772 kg Tare           1.675 kg Net           3.097 kg
* Thank you *	Gross/Tare/Net weights	* Thank you *
	Footer	

Multi Line - Format for 16 character printer

Multi Line wide- Format for minimum 24 or more character printer

Format for minimum 26 or more characters printer:

FLINTEC GmbH. www.flintec.com Meckesheim, Germany	Header	FLINTEC GmbH www.flintec.com Meckesheim, Germany
25.05.2022 09:16 CN           34	Date & Time	Date           25.05.2022 Time           09:16 CN           34
OPERATOR JOSEPH SMITH MATERIAL ASCORBIC ASID	Ticket no	OPERATOR JASMINE WHITE MATERIAL ROSE PARFUME
G           4.772 kg T           1.675 kg N           3.097 kg	Identifications	Gross           4.772 kg Tare           1.675 kg Net           3.097 kg
* Thank you *	Gross/Tare/Net weights	* Thank you *
	Footer	

26F1 – Includes only Gross or Net weight value

26F2 – Includes Gross or Gross\Tare\Net weight values

## 13.4 EPL format

The EPL format of the data output in Print mode is selected to print the label data in graphic format EPL.

Labels can be designed in EPL format by using the printer label design software and FLINTEC software as described below.

1. Connect FT-112 weighing terminal to FLINTEC Indface software.
2. Enter EPL print format window. You will find the command table which includes commands to get data from weighing into the label design.
3. Open label design software of the printer. Design your label by using the commands in item 2.
4. Save/Compile/ Convert your design to EPL format in Label design software.
5. Import the EPL file in to Indface window.
6. Load this file in to weighing terminal.



Figure 13.1- Sample of the label printout of FT-112 which is designed in EPL format.

If the label design can be saved into the printer, the default of EPL format of FT-112 can be transferred to the printer to print a designed label. The default of EPL format is:

```
Net weight      748
Gross weight    748
Tare weight     0
Date            25.05.2018
Time            08:39
Consecutive number 4
Alibi number    0
Unit            kg
ID1 Name        ID 1
ID1 Data
ID2 Name        ID 2
ID2 Data
Active APW value 1.000
Pieces          0
Active scale number 1
```

## 13.5 BSI Data Structure for dialog with PC and PLC

FLINTEC instruments are able to be integrated into a computer system, data acquisition system, data logging system etc. FLINTEC weighing terminals in the market support the standardized command set BSI data form, depending on the functionality of the instrument.

Connecting the FT-112 to your computer or with your PLC which does not have any fieldbus interface, using BSI commands will help to equip your system with additional FLINTEC scales without having to change your application programs.

This easy data format provides a reliable and quick interface advantage when communicating with a PLC or PC for process control. BSI is divided into 2 levels:

BSI-BASE        Command sets of basic weighing instruments, e.g. taring, zeroing, setpoint loading.  
 BSI-PRO        Extension of the command set for professional weighing terminals, e.g. commands related with identification data application related commands.

General Rules:

- |    |   |
|----|---|
| 1. | Commands are only in CAPITAL.   |
| 2. | CHK (2 ASCII char) can be enabled or disabled from both command and response.           |
| 3. | Weight data and limit values are 8-byte with dot and non-significant zeros on the left. |
| 4. | Headers are 16-byte length.   |
| 5. | ID identification data are 32-byte length.  |
| 6. | APW at piece weighing are 12-byte length.   |
| 7. | Address (2 ASCII char) will be located in the structure, if not 00.                     |

Command format:

A general description of the command is as follows:

[ADR][COMMAND][CHK][CR][LF]

Response format with weight:

A general description of the response is follows:

[ADR][COMMAND][STATUS][SIGN][WEIGHT][CHK][CR][LF]

Response format without weight:

[ADR][COMMAND][STATUS][CHK][CR][LF]

**Note:** CHK, CR and LF will not be shown in below data format descriptions in this section.

Status Table:

The status data in the interfacing are listed below

A	Ack, the command is operated successfully
D	Dynamic, unstable weight
E	Errors except of H, L, O, +, -.
H	High voltage detected
I	The weight is in range
L	Low voltage detected
M	Mean (Average)
N	Nack, the command couldn't be operated
O	ADC out
S	Stable weight
X	Syntax error (not recognized the received command)
+	Overload
-	Underload



BSI-Base Commands and Responses:

A	Read all weight data immediately
B	Read Gross weight value immediately
C	Clear the tare memory
G	Read voltage value of DC power supply
I	Read current weight (indicated) value immediately
P	Read the current stable weight value
Q	Load set point values
R	Read set point values
S	Read Status
T	Tare
U	Read digital inputs
V	Read digital outputs
W	Set/Reset digital outputs
X	Read current weight value in increased resolution immediately
Z	Zero

BSI-BASE Command Table:

Description	Command	Response
Read all weight data immediately	[ADR][A]	[ADR][A][STATUS][SIGN][NET W] [SIGN][TARE W] [SIGN] [GROSS W]
Read Gross weight value immediately	[ADR][B]	[ADR][B][STATUS][SIGN][WEIGHT VALUE]
Clear the tare memory	[ADR][C]	[ADR][C][A]
Read the last printed data	[ADR][DO]	[ single line data format ]
Print the label	[ADR][DJ]	[ADR][DJ][A]
Read stable weight and Record to Alibi	[ADR][DV]	[ADR][DV][A][STATUS][SIGN][NET W] [SIGN][TARE W][SIGN] [GROSS W] [ALIBI NUMBER]
Erase all data logging in the SD card.	[ADR][E]	[ADR][E][A]
Start / stop continuous data output	[ADR][F] [X] X=0; Disable X=1; Enable	[ADR][F][A]
Read voltage value of DC power supply	[ADR][G]	[ADR][G][STATUS][VOLTAGE VALUE]
Read current weight (indicated) value immediately	[ADR][I]	[ADR][I][STATUS][SIGN][WEIGHT VALUE]
Read all data logging in the SD card	[ADR][L]	[ADR][L][A][All DATA]
Read the scale name	[ADR][N]	[ADR][N][A][16 digits]
Read the stable weight	[ADR][P]	[ADR][P][STATUS][SIGN][WEIGHT VALUE]
Load set points	[ADR][Q][SP No][L][SIGN][SP VALUE]	[ADR][Q][STATUS]
Read set points	[ADR][R][SP No][L]	[ADR][R][STATUS][SIGN][SP VALUE]
Read Status	[ADR][S]	[ADR][S][STATUS-1][STATUS-2] [STATUS-3]
Tare	[ADR][T]	[ADR][T][STATUS]
Read digital inputs	[ADR][U]	[ADR][U][STATUS][Inputs]
Read digital outputs	[ADR][V]	[ADR][V][STATUS][Outputs]
Set/Reset digital outputs	[ADR][W][Outputs]	[ADR][W][STATUS]

Read weight value in increased resolution	[ADR][X]	[ADR][X][STATUS][SIGN][WEIGHT VALUE]
Zero	[ADR][Z]	[ADR][Z][STATUS]

**BSI-PRO Commands and Responses:**

Description	Command	Response
ID1 name and data write	DA 1 [16d name ] [32 digit data]	DAA
ID2 name and data write	DA 2 [16d name ] [32 digit data]	DAA
ID1 name write	DH 1 [16 digits name]	DHA
ID1 data write	DI 1 [32 digits data]	DIA
ID2 name write	DH 2 [16 digits name]	DHA
ID2 data write	DI 2 [32 digits data]	DIA
ID1 name and data read	DK 1	DKA [16d name ] [32 digits data]
ID2 name and data read	DK 2	DKA [16d name ] [32 digits data]
Write SmartAPP and apply	DB+[8 digits Limit-1]+[8d Limit-2] +[8d Limit-3]+[8d Limit-4]+[8d Limit-5]+[8d Limit-6]	DBA
Start dynamic weighing	DD	DDA
Read dynamic weight	DR	DRA+[8 digits Weight data]
Reset ( to basic weighing )	DE	DEA
Write preset tare and apply	DP+[8 digits PT data]	DPA
Read preset tare	DQ	DQA+[ 8 digits PT data ]
Write APW and apply	DM [ 12 digits APW data ]	DMA
Read APW	DN	DNA [ 12 digits APW data ]
Key lock / unlock	DL[X] X=0; Disable X=1; Enable	DLA
Read piece counting value	DC	DCA+[8 digits PCS data ]
Write to alphanumeric display	DT [16 digits data]	DTA
Send data over interface n	DS[n][Data] n=1; RS232C-1 n=2; RS232C-2 n=3; RS485 n=4; USB n=5; Ethernet	DSA
Switch to scale	DF[X] X=1; First scale X=2; Second scale X=3; Summing scale	DFA
Weight display in blank	DG[X] X=0; Disable X=1; Enable	DGA
Change the backlight color	DU[X] X=0; controlled by FT-112 X=1; Off X=2; White X=3; L. green X=4; Green X=5; Turquoise X=6; Blue X=7; Yellow X=8; Amber X=9; Red	DUA

Checksum Calculation:

CHK is transmitted as two ASCII characters calculated with the Checksum formulation.

Checksum = 0 – (SUM of all response data before CHK)

**Example:** Read stable current weight data.

BSI Examples: (CHK is enabled and instrument address is 01)

Command: 01P[CHK][CR][LF]

Checksum = 0 – (0x30 + 0x31 + 0x50)  
 = 0 – 0XB1  
 = 0x4F  
 = Char '4' and 'F'

Response: 01PS+000123.4[CHK][CR][LF]

Checksum = 0 – (0x30 + 0x31 + 0x50 + 0x53 + 0x2B + 0x30 + 0x30 + 0x30 + 0x31+ 0x32 + 0x33 +  
 +0x2E + 0x34)  
 = 0 – 0x02B7  
 = 0x49  
 = Char '4' and Char '9'

### 13.5.1 BSI-Base Commands

A	Read all weight data
---	----------------------

Command : [ADR][A]  
 Response : [ADR][A][STATUS][SIGN][NET W][SIGN][TARE W][SIGN][GROSS W]  
 Example :  
     Command : 01A  
     Response : 01AS+000123.4+000111.1+000234.5  
               01AD+000123.4+000111.1+000234.5  
               01AO           (ADC out error)

Comments:

The response is net, tare and gross weight values or error status.

All weight data is transmitted immediately after receiving the command.

B	Read Gross weight
---	-------------------

Command : [ADR][B]  
 Response : [ADR][B][STATUS][SIGN][WEIGHT VALUE]  
 Example :  
     Command : 01B  
     Response : 01BS+000123.4           (gross weight is stable and 123.4)  
               01BD+000123.4           (gross weight is dynamic and 123.4)  
               01B-                    (under load)

Comments: The response is the gross weight value (stable or dynamic) or error status.

Gross weight data is transmitted immediately after receiving command.

C	Clear the tare memory
---	-----------------------

Command : [ADR][C]  
 Response : [ADR][C][A]   (Cleared and the scale is in gross mode)

Comments: The response status is always Ack in weighing or force mode.

DO	Read the last printed data
----	----------------------------

Command : [ADR][DO]  
 Response : [ single line data format ]  
 Example :

    Command : 01DO  
     Response : G: 53.55kg T: 0.00kg N: 53.55kg

Comments : The last printed values are transmitted immediately after receiving the command.

Single line data format can be change due to its configuration. Refer to section 13.3 and sub-block.

DJ	Print the label
----	-----------------

Command : [ADR][DJ]  
Response : [ADR][DJ][ STATUS]  
Example :

Command : 01DJ  
Response : 01DJA (Weight is stable and printed) or  
01DJN (Could not print)

Comments: Checks status and it must be stable. Else Nack status is sent. Status can be Stable or Nack.

DV	Read stable weight and Record to Alibi
----	--

Command : [ADR][DV]  
Response : [ADR][DV][STATUS][SIGN][NET W][SIGN][TARE W][SIGN][GROSS W][ALIBI NUMBER]  
Example :

Command : 01DV  
Response : 01DVS+000123.4+000111.1+000234.5\*00001\*  
01DVO (ADC out error)

Comments :The response is net, tare, gross weight and alibi number values or error status.  
All weight data is transmitted immediately after receiving the command, if weight is stable.

E	Erase the all data logging in the SD card
---	---

Command : [ADR][E]  
Response : [ADR][E][ STATUS]  
Example :

Command : 01E  
Response : 01EA (All data logging erased) or  
01EN (Data logging could not erased)

Comments : Acknowledge (ACK) is transmitted after all data logging erased.

F	Start /stop continuous data output
---	------------------------------------

Command : [ADR][F][ENABLE/DISABLE]  
Response : [ADR][F][STATUS]  
Example :

Command : 01F1 (Enable)  
01F0 (Disable)  
Response : 01FA (Command is done successfully)  
01FN (Command could not executed)

Comments : Indicated weight value sends continuously.  
Continuous data format is [ADR][I][STATUS][SIGN][WEIGHT VALUE].

G	Read voltage value of DC power supply
---	---------------------------------------

Command : [ADR][G]  
Response : [ADR][G][STATUS][VOLTAGE VALUE]  
Example :

Command : 01G  
Response : 01GA234 (Power supply is 23.4 VDC)  
01GA150 (Power supply is 15.0 VDC)

Comments: Voltage value is 3 byte and sends with 0.1 V increment.

I	Read indicated weight
---	-----------------------

Command : [ADR][I]  
Response : [ADR][I][STATUS][SIGN][WEIGHT VALUE]  
Example :

Command : 01I  
Response : 01IS+000123.4 (Weight is stable and 123.4)  
01ID+000123.4 (Weight is dynamic and 123.4)  
01I+ (Overload)

Comments: Indicated weight value (stable or dynamic) is transmitted immediately.  
The weight value may be in gross or net.

L	Read the all data logging in the SD card
---	--

Command : [ADR][L]  
Response : [ADR][L][ ALL DATA]  
Example :  
    Command : 01L  
    Response : 01LA[ALL DATA] (All data logging is sending) or  
              01LN (SD card could not read or there is no SD card)  
Comments : All data logging sends after acknowledge (ACK).

N	Read the scale name
---	---------------------

Command : [ADR][N]  
Response : [ADR][N][STATUS][ 16 digits ]  
Example :  
    Command : 01N  
    Response : 01NASCALE-1 (Scale name is SCALE-1)  
Comments : Scale name is transmitted immediately after receiving command.

P	Print: Read the stable weight
---	-------------------------------

Command : [ADR][P]  
Response : [ADR][P][STATUS][SIGN][WEIGHT VALUE]  
Example :  
    Command : 01P  
    Response : 01PS+000123.4 (Weight is stable and 123.4) or  
              01PN (Could not print)  
Comments : Checks status and it must be stable. Else Nack status is send.  
Status can be Stable or Nack.

Q	Load set points
---	-----------------

Command : [ADR][Q][SET No][L][SIGN][SP VALUE]  
Response : [ADR][Q][STATUS]  
Example :  
    Command : 01Q01L+000123.4  
    Response : 01QA (123.4 loaded to SP1)  
              01QN (Could not loaded)  
              01QX (Decimal point of SP VALUE is mismatch)

Comments:  
SP Number is 2 byte ASCII char. Use 01 for SP1, 02 for SP2 and 03 for SP3.  
SP VALUE data is 8-byte ASCII char with dot and non-significant zeros on the left.

R	Read set points
---	-----------------

Command : [ADR][R][SP No][L]  
Response : [ADR][R][STATUS][SIGN][SP VALUE]  
Example :  
    Command : 01R01L  
    Response : 01RA+000123.4 (SP1 is 123.4)  
              01RN (Could not loaded)

Comments:  
SP No is 2 byte ASCII char. Use 01 for SP1, 02 for SP2 and 03 for SP3.  
SP VALUE data is 8-byte ASCII char with dot and non-significant zeros on the left.

S	Read Status
---	-------------

Command : [ADR][S]  
Response : [ADR][S][STATUS-1][STATUS-2][STATUS-3]  
Example :  
    Command : 01S  
    Response : 01SSGI (Stable, Gross, In Range)  
              01SDGL (Dynamic, Gross, Low voltage error)

Comments:

The response includes 3 status information.

STATUS-1 can be Stable or Dynamic.

STATUS-2 can be Gross or Net.

STATUS-3 can be 'In range', 'Out of range', '+ Over', '- Under', 'Low voltage', 'High voltage' or 'Errors'.

T	Tare
---	------

Command : [ADR][T]  
 Response : [ADR][T][A] (Taring is done successfully and scale is in net)  
           : [ADR][T][N] (Taring could not be executed)  
           : [ADR][T][X] (Taring is disabled)

Comments:

The tare value is overwritten by the new tare weight value.

Status must be stable in 2 seconds time out delay. If so, Ack is send.

If it cannot be stable in time out delay, Nack is send.

U	Read digital inputs
---	---------------------

Command : [ADR][U]  
 Response : [ADR][U][STATUS][Inputs]  
 Example :  
           Command : 01U  
           Response : 01UA03 (Input 2 and Input 1 are active)  
                     : 01UA4296 (Input 15,10,8,5,3,2 are active)  
                     : 01UAFF (All 8 inputs are active)  
                     : 01UN (Could not read inputs)

Comments: Data length change according to number of digital inputs.

Inputs are implemented to ASCII char of 4-bit. '1111' inputs are implemented to char 'F'.

INPUTS	IN-16	IN-15	IN-14	IN-13	IN-12	IN-11	IN-10	IN-9	IN-8	IN-7	IN-6	IN-5	IN-4	IN-3	IN-2	IN-1
Bit wise	0	1	0	0	0	0	1	0	1	0	0	1	0	1	1	0
ASCII	4				2				9				6			

V	Read digital outputs
---	----------------------

Command : [ADR][V]  
 Response : [ADR][V][STATUS][Outputs]  
 Example :  
           Command : 01V  
           Response : 01VA03 (Output 2 and Output 1 are active)  
                     : 01VA4296 (Output 15,10,8,5,3,2 are active)  
                     : 01VAFF (All 8 outputs are active)  
                     : 01VN (Could not read outputs)

Comments:

Data length change according to number of digital outputs.

Outputs are implemented to ASCII char of 4-bit. '1111' is implemented to char 'F'.

OUTPUTS	OUT-16	OUT-15	OUT-14	OUT-13	OUT-12	OUT-11	OUT-10	OUT-9	OUT-8	OUT-7	OUT-6	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	0	1	0	0	0	0	1	0	1	0	0	1	0	1	1	0
ASCII	4				2				9				6			

W	Write (Set/Reset) digital outputs
---	-----------------------------------

Command : [ADR][W][Outputs]  
 Response : [ADR][W][STATUS]  
 Example :  
     Command : 01W4296  
     Response : 01WA (Outputs 15,10,8,5,3,2 are activated)  
               01WN (Outputs could not be activated)

Comments:

Data length change according to number of digital outputs.

Outputs are implemented to ASCII char of 4-bit. '1111' outputs are implemented to char F'.

OUTPUTS	OUT-16	OUT-15	OUT-14	OUT-13	OUT-12	OUT-11	OUT-10	OUT-9	OUT-8	OUT-7	OUT-6	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	0	1	0	0	0	0	1	0	1	0	0	1	0	1	1	0
ASCII	4				2				9				6			

X	Read weight value in increased resolution
---	---

Command : [ADR][X]  
 Response : [ADR][X][STATUS][SIGN][WEIGHT VALUE]  
 Example :  
     Command : 01X  
     Response : 01XS+00123.41 (weight is stable and 123.41) or  
               01XD+00123.41 (weight is dynamic and 123.41) or  
               01XE (Error)

Comments: The response includes weight data with divided the increment to 10.

Z	Zero
---	------

Command : [ADR][Z]  
 Response : [ADR][Z][A] (Zeroed)  
            [ADR][Z][N] (Zeroing could not be operated)  
            [ADR][Z][X] (Zeroing is disabled)

Comments:

Zero command can not work in net weighing.

Weight must be in zeroing range for all operating modes.

Status must be stable for 2 seconds. If so, Ack is sent.

If unstable during time out delay, Nack is sent.

## 13.6 Modbus RTU

FT-112 controller has a Modbus RTU interface over RS485 / RS232C serial port. This interface can be programmed to High-Low or Low-High for different type of PLC's. You can find the difference in these data formats and some companies using these formats below. Two types are available as:

### 13.6.1 Modbus RTU and TCP/IP Data Structure

After programming RS485 / RS232C serial port for Modbus RTU, it can be used as a Modbus RTU slave on Modbus RTU network. The Modbus slave address is defined in the RS-485 address (**Page 44**). Function code '0x03' (Read Holding Registers), '0x06' (Single Write Register), '0x17' (Read/Write Multiple Registers) and '0x10' (Preset Multiple Registers) are supported.

**Modbus High-Low:** In two-word registers, the data is stored in the registers in big-endian format. Least significant word is stored in the highest register address; and most significant word is stored in the lowest register address.

**Modbus Low-High:** In two-word registers, the data is stored in the registers in little-endian format. Least significant word is stored in the lowest register address; and most significant word is stored in the highest register address.

Parameter set-up:

Set the RS 485 / RS 232C Data Format : Modbus RTU High-Low or Modbus RTU Low-High

RS-485 Data Length & Parity : 8 none 1, 8 odd 1 or 8 even 1

RS-485 Address : 01 to 31

Programme the RS-485 / RS 232C parameter settings as defined on **Page 42, 44**.

Please find Modbus information in the web site of <http://www.modbus.org>

Modbus RTU and Modbus TCP/IP Command Table;

Address	R/W	Word	Command	Definition		
40001	R	2	Actual weight (Net if the indication is in Net)			
40003	R/W	2	Tare weight			
40005	R	2	Gross weight			
40007	R	2	Status	<b>Bit</b>	<b>Definition</b>	
				B0	0 – Dynamic is inactive	1 – Dyn weight is calculating
				B1	0 – Weight is actual weight	1 – Weight is dynamic result
				B2	0 – Weight is Stable	1 – Weight is unstable
				B3	0 – Gross mode	1 – Net mode
				B4	0 – Preset tare is passive	1 – Preset tare is active
				B5	0 – Not power on zeroed	1 – Zeroed with pwr on zero
				B6	0 – First Unit (power on)	1 – Second Unit
				B7	0 – Weight mode	1 – Counting mode
				B8	0 – 1 <sup>st</sup> Scale is passive	1 – 1 <sup>st</sup> Scale is active
				B9	0 – 2 <sup>nd</sup> Scale is passive	1 – 2 <sup>nd</sup> Scale is active
				B10	0 – Summing scale passive	1 – Summing scale active
				B11	0 – Key lock is passive	1 – Key lock is active
				B12	0 – Out of center of zero	1 – Weight is in center of zero
				B13	0 – High res. is passive	1 – High res. is active
				B14-B26	Not used	
B27	0 – None	1 – Decimal point is X.XXXX				
B28	0 – None	1 – Decimal point is X.XXX				
B29	0 – None	1 – Decimal point is X.XX				



				B30	O – None	1 – Decimal point is X.X
				B31	O – None	1 – No decimal point
40009	R	2	Error Status	Bit	Definition	
				B0	O – No Error	1 – Low voltage det.
				B1	O – No Error	1 – In programming mode
				B2	O – No Error	1 – System error
				B3	O – No Error	1 – ADC under range
				B4	O – No Error	1 – ADC over range
				B5	O – No Error	1 – ADC out of range
				B6	O – No Error	1 – Tilt Switch is active
				B7– B31	Not used	
40011	R	2	Heartbeat for connection check, this value is increased every 100 milliseconds.			
40013	R	2	Last print value/pcs			
40015	R/W	2	CN (Label number)	Refer to parameter [254] on page 56		
40017	R	2	Quantity of M+			
40019	R	2	Total			
40021	R/W	4	Grand Total	Use Dword at floating point operation		
40025	R/W	2	Commands	<b>Dec</b>	<b>Definition</b>	
				0	None	
				1	Zero	
				2	Tare	
				3	Clear	
				4	Print	
				5	Reprint the last label	
				6	High resolution enable	
				7	High resolution disable	
				8	Unit change (from first to second unit)	
				9	Unit change (from second to first unit)	
				10	Keylock enable	
				11	Keylock disable	
				12	Dynamic Start	
				13	Dynamic Reset	
				14	M+ key usage	
				15	Totalization Print (MRC key and Print key)	
				16	Totalization Cancel.	
				17	SmartAPP Start	
				18	SmartAPP Reset	
				19	Switch to 1.Scale	
				20	Switch to 2.Scale	
				21	Switch to Summing Scale	
				22	Switch to Counting mode	
23	Switch to Weighing mode					
40027	R	2	Commands status	0	None	
				1	Command is processing...	
				2	Command is successfully.	

				3	Command failed.	
40029	R/W	2	Current APW value			
40031	R/W	10	Reserve			
40041	R	2	Status of Inputs	Bit	Definition	
				B0	Input-1	0 – Passive 1 – Active
				B1	Input-2	
				B2	Input-3	
B3	Input-4					
40043	R/W	2	Status of Outputs	B0	Output-1	0 – Passive 1 – Active
				B1	Output-2	
				B2	Output-3	
				B3	Output-4	
				B4	Output-5	
40045	R/W	2	Basic weighing	Filling	Checkweighing / Packing	Classifying
			Setpoint 1	Target	Target	Target
40047	R/W	2	Setpoint 2	Coarse	Low	- - Low
40049	R/W	2	Setpoint 3	Fine	High	-Low
40051	R/W	2	Setpoint 4	TareMin	Empty	+High
40053	R/W	2	Setpoint 5	TareMax	Not used	++High
40055	R/W	2	Not used	Empty	Not used	Empty
40057	R/W	30	Reserve			
40087	R	2	Alibi number			
40089	R	2	Net weight			
40091	R	2	Tare weight			
40093	R	2	Gross weight			

40127	R/W	2	Dynamic filter	Refer to parameter [332] on page 59		
40129	R/W	2	Digital filter	Dec	Description	
				0	No	
				1	Very Low	
				2	Low	
				3	Medium	
				4	High	
40131	R/W	2	Power on zero	5	Very High	
				0	Disable	
				1	± 2%	
				2	± 2%LK	
				3	± %10	
				4	+ %15, - %5	
40133	R/W	2	Zeroing Range	5	± %20	
				0	Disable	
				1	± 2%	
				2	± 3%	
				3	± 20%	

				4	± 50%
40135	R/W	2	Auto Zero Tracking	0	Disable
				1	± 0,3d
				2	± 0,5d
				3	± 1d
				4	± 2d
				5	± 3d
40137	R/W	2	Tare	0	No
				1	Multi tare
				2	Tare only at gross
				3	Preset tare
40139	R/W	2	Stability Detection Range	4	Preset tare at gross
				0	± 0,3d
				1	± 0,5d
				2	± 1d
				3	± 2d
				4	± 3d
5	± 4d				
6	Disable				
40141	R/W	2	Stability Time	Refer to parameter [517] on page 64	
40143	R/W	10	Reserve		
40153	R/W	2	Unit	<b>Dec</b>	<b>Description</b>
				0	g
				1	kg
				2	t
				3	lb
				4	oz
5	No				
40155	R/W	2	Range	0	Single range
				1	2 x MR
				2	3 x MR
				3	2 x MI
4	3 x MI				
40157	R/W	2	MAX-1	Refer to parameter [523] on page 65	
40159	R/W	2	Decimal point-1	<b>Dec</b>	<b>Description</b>
				0	XXXXOO
				1	XXXXXO
				2	XXXXXX
				3	XXXXX.X
				4	XXXX.XX
5	XXX.XXX				
40161	R/W	2	Increment-1	<b>Dec</b>	<b>Description</b>
				1	X 1
				2	X 2
				3	X 5
40163	R/W	2	MAX-2		
40165	R/W	2	Decimal point-2		
40167	R/W	2	Increment-2		
40169	R/W	2	MAX-3		
40171	R/W	2	Decimal point-3		
40173	R/W	2	Increment-3		
40175	R/W	2	Limit of Indication	<b>Dec</b>	<b>Description</b>

				0	Over indication after Max.
				1	1 division more than Max.
				2	9 division more than Max.
				3	2% more than Max.
				4	5% more than Max.
40177	R/W	8	Reserve		
40185	R/W	2	Calibration Commands	<b>Decimal</b>	<b>Definition</b>
				0	None
				188	Adjust Zero Calibration command
				220	Adjust Span Calibration command (first, load test weight value to 40187)
				23205	Apply the coefficients of eCal (first, load 40189, 40191 and 40193)
40187	R/W	2	Span Calibration Value		
40189	R/W	2	Total Load Cell capacity for eCal (FT-112 only)		eCal Coefficients
40191	R/W	2	Average mV/V value for eCal (FT-112 only)		
40193	R/W	2	Dead load value for eCal		
40195	R	2	Calibration Process Status & Errors	Bit	Definition
				B0	Ready for calibration
				B1	Zero calibration in process ...
				B2	Span calibration in process ...
				B3	Calibration Timeout - Restart calibration
				B4	ADC Error - Re-energize the instrument - If seen again, change the board.
				B5	Instrument cannot be calibrated - Check load cell cable - Re-energize the instrument
				B6	Instrument cannot be calibrated - Load cell signal is very low or too high
				B7	Calibration Error - Calibration load is not enough - Check test weight load - Check load cell connections
				B8	Calibration load value entry Error - Test weight is too small. Increase the weight
B9	Scale is unstable - Wait until scale is stable - Check grounding wiring				
B10	The Calibration DIP switch is not in the 'On' position. - Check the calibration DIP switch.				
40197	R/W	10	Reserve		
40207	R	2	Voltage of Power Supply	The value is indicated with 0.1 VDC increment for DC variant or 1 VAC increment for AC variant.	

40209	R	2	Load cell millivolt value (FT-112 only)	Millivolt value of active scale is indicated with 0.01 mV increment. For example: 2.34 mV is indicated as integer 234 value.
40211	R/W	2	Load parameter's defaults	Write 0x6BB6 value to load parameter's defaults.
40213	R/W	2	Load factory defaults	Write 0x7CC7 value to load factory defaults.

Applications					
40255	R/W	2	Application	Refer to parameter [311] on page 57	
				0	No
				1	CHEC
				2	CLAS
				3	FILL
40257	R/W	2	Limits	Refer to parameter [312] on page 57	
				0	VAL
				1	TOL
				2	%
40259	R/W	2	Information display	Refer to parameter [313] on page 57	
				0	NO
				1	ID1T
				2	ID2T
40261	R/W	2	SmartAPP displaying	Refer to parameter [314] on page 57	
				0	NO
				1	BAR
				2	COLO
40263	R/W	2	Display color change	Refer to parameter [315] on page 57	
				0	RAAY
				1	YAAR
				2	RBAY
40265	R/W	2	The display color changing	Refer to parameter [316] on page 57	
				0	STAB
				1	IMME
				3	CROS
40267	R/W	2	Acoustic warning	Refer to parameter [317] on page 57	
				0	NO
				1	OKAY
				2	OVER
40269	R/W	2	Start method	Refer to parameter [321] on page 58	
				0	AUTO
				1	MANU
				2	SAUT
40271	R/W	2	Filling type	Refer to parameter [322] on page 58	
				0	GROS
40273	R/W	2	Taring delay at filling	Refer to parameter [323] on page 58	
				1	NET
40275	R/W	2	Totalization type	Refer to parameter [324] on page 58	
				0	NO
				1	HORI
				2	VERT

40277	R/W	2	Grand total erase	Refer to parameter [325] on page 58	
				0	MRC
				1	PASS
40279	R/W	2	Output changing	Refer to parameter [326] on page 58	
				0	STAB
				1	IMME
40281	R/W	2	Not used		
40283	R/W	2	Packing type	Refer to parameter [327] on page 58	
				0	GROS
				1	TARE
				2	PT
				3	TAKE
4	SNDW				
Identifications					
40385	R	8	Information display	8 characters; Null terminated.	
40393	R	8	Not used		
40401	R/W	8	ID 1 Name	16 characters; Null terminated.	
40409	R/W	16	ID 1 Data	32 characters; Null terminated.	
40425	R/W	8	ID 2 Name	16 characters; Null terminated.	
40433	R/W	16	ID 2 Data	32 characters; Null terminated.	

#### Programming steps for frequently used items.

Reading a weight value:

Read 40009 and 40010.

Check error status,

If there is no error, read a weight value (gross, net or tare),

If there is an error, check the error code.

#### Zero Calibration procedure:

Check the bit B0 of 40195. it should be '1' to start adjustment.

Load the decimal '188' to 40185 to start Zero calibration.

Check the bit B1 of 40195. it is '1' during zero calibration process.

The bit B0 of 40195 changes to '1' at the end of the Zero calibration.

If one of error bits (B3 ~ B10) of 40195 is '1', check error code to find the calibration error.

#### Span Calibration procedure:

Check the bit B0 of 40195. it should be '1' to start adjustment.

First load the span value to 40187-188 and then load the decimal '220' to 40185 to start Span calibration.

Check the bit B2 of 40195.. it is '1' during span calibration process.

The bit B0 of 40195 changes to '1' at the end of the Span calibration.

If one of error bits (B3 ~ B10) of 40195 is '1', check error code to find the calibration error.

#### EXPLANATION:

**Attention:** For hardware connection details, please refer to the related hardware descriptions in this manual.

Exception codes:

- 1: Function code is not supported.
- 2: Out of beginning and ending address range.
- 3: Invalid value entrance or wrong byte number.
- 4: Operation error.

## Command Examples:

Performing Read and Write operations according (Modbus High-Low) to hex system with the instrument set to address "0x01".

Description	Hex
Request weight data	01,03,00,00,00,02,C4,0B
Answer of request weight (weight value is 100000 )	01,03,04,00,01,86,A0,38,4A
Request status data	01,03,00,07,00,02,75,CA
Taring	01,10,00,18,00,02,04,00,00,00,02,72,C4
Request tare data	01,03,00,02,00,02,65,CB
Answer of request tare (tare value is 10000)	01,03,04,00,00,27,10,E0,0F
Zero Command	01,10,00,18,00,02,04,00,00,00,01,32,C5
Request Calibration Status	01,03,00,C2,00,02,65,F7
Answer of request Calibration Status (Instrument is ready for calibration)	01,03,04,00,00,00,01,3B,F3
Zero Calibration	01,10,00,B8,00,02,04,00,00,00,BC,F8,CC
Span Calibration Command with Span value 50000	01,10,00,B8,00,04,08,00,00,00,DC,00,00,C3,50,94,84
Total LC capacity Command with Total LC capacity value 100000	01,10,00,BC,00,02,04,00,01,86,A0,CB,56
Average mV/V Command with Average mV/V value 1.9999	01,10,00,BE,00,02,04,00,00,4E,1F,0D,3F
Dead load Command with Dead load value 12345	01,10,00,C0,00,02,04,00,00,30,39,2B,ED
Save the coefficients of eCal Command	01,10,00,B8,00,02,04,00,00,5A,A5,03,A6
Read digital inputs	01,03,00,28,00,02,44,03
Answer of digital inputs (Input-2 is active)	01,03,04,00,00,00,02,7B,F2
Read digital outputs	01,03,00,2A,00,02,E5,C3
Answer of digital outputs (Output-3 is Active)	01,03,04,00,00,00,04,FB,FO
Read Setpoint-1	01,03,00,2C,00,02,05,C2
Answer of Setpoint-1	01,03,04,00,00,03,E8,FA,8D
Load Set point 1 = 5000	01,10,00,2C,00,02,04,00,00,13,88,FC,B4

## 13.7 Ethernet TCP/IP

Ethernet output of FT-112 is programmable in BSI command set, Continuous data output, Fast continuous data output, Modbus TCP/IP High-Low, Modbus TCP/IP Low-High. The first three data structures can be found in the related sections indicated in the table below.

You can find the difference of Low-High and High-Low data formats and some companies using these formats below.

Data Format	Description	Company samples
BSI Command set	Refer to <b>Page 113</b> .	
Continuous	Refer to <b>Page 107</b> .	-
Fast Continuous	Refer to <b>Page 108</b> .	-
Modbus TCP High-Low	Modbus TCP interfacing. Refer to <b>Page 119</b> .	Interfacing with PLC.
Modbus TCP Low-High	Modbus TCP interfacing. Refer to <b>Page 119</b> .	Interfacing with PLC.

Table 13.1 - Ethernet output interfacing

You can communicate with the indicator after programming Ethernet TCP/IP and Modbus TCP related parameters [ 15- ].

### 13.7.1 Ethernet Parameters

Ethernet parameters can be adjusted with keys in the programming mode. Refer to parameter block [ 15- ]. Additionally, Ethernet parameters set up is done by EtherX PC software over Local Network Area or by IndFace2x. Both software versions are available on internet [www.flintec.com](http://www.flintec.com).

Parameters	Descriptions
Host Name	Device name of the instrument. Refer to <b>parameter 255</b> .
IP Address	Obtain IP address manually. Refer to <b>parameter 152</b> .
Local Port	Ethernet connection port of the instrument. Refer to <b>parameter 156</b> .
Gateway	Network point that acts as an entrance to another network. Refer to <b>parameter 155</b> .
Subnet Mask	Describes IP address can be used in network. Refer to <b>parameter 154</b> .
Primary DNS	Obtain primary DNS manually. Refer to <b>parameter 159</b> .
Secondary DNS	Obtain secondary DNS manually.
Remote Connection Check Box	Automatic connection to any device on the network. Refer to <b>parameter 15E and 15F</b> . Default is 'Disabled'.
Remote IP Address	IP address of the PC, Printer or Device to be connected automatically. Enter IP address of the remote device.
Remote Port	Ethernet connection point of PC, Printer or Device to be connected automatically. Enter port number of the remote device.
Password	Default password is <b>123456</b> .
Set Defaults	Sets factory defaults.



## 13.7.2 Modbus TCP Data Structure

If the instrument is programmed for Modbus TCP/IP, it can be used as a Modbus TCP/IP slave on Ethernet communication network. Function code '0x03' (Read Holding Registers), '0x06' (Single Write Register), '0x17' (Read/Write Multiple Registers) and '0x10' (Preset Multiple Registers) are supported.

**Modbus TCP/IP High-Low:** In two-word registers, the data is stored in the registers in big-endian format. Least significant word is stored in the highest register address; and most significant word is stored in the lowest register address.

**Modbus TCP/IP Low-High:** In two-word registers, the data is stored in the registers in little-endian format. Least significant word is stored in the lowest register address; and most significant word is stored in the highest register address.

Parameter's set-up:

Set Ethernet Data Format : Modbus TCP/IP High-Low or Modbus TCP/IP Low-High

Ethernet Address : 01 to 255

Programme the Ethernet parameter settings as defined on 15-.

Please find Modbus information in the web site of <http://www.modbus.org>

**Modbus TCP/IP Command Table** see page 119

# 14 OPTIONAL BOARDS

This section describes the mechanical installation of optional interface boards which are analogue output, Profibus, Profinet, CANopen, EtherNet/IP, EtherCAT, CC-Link, Powerlink. The digital Inputs and Outputs are already included on these boards.

Follow the steps below for installation of the interface option board.

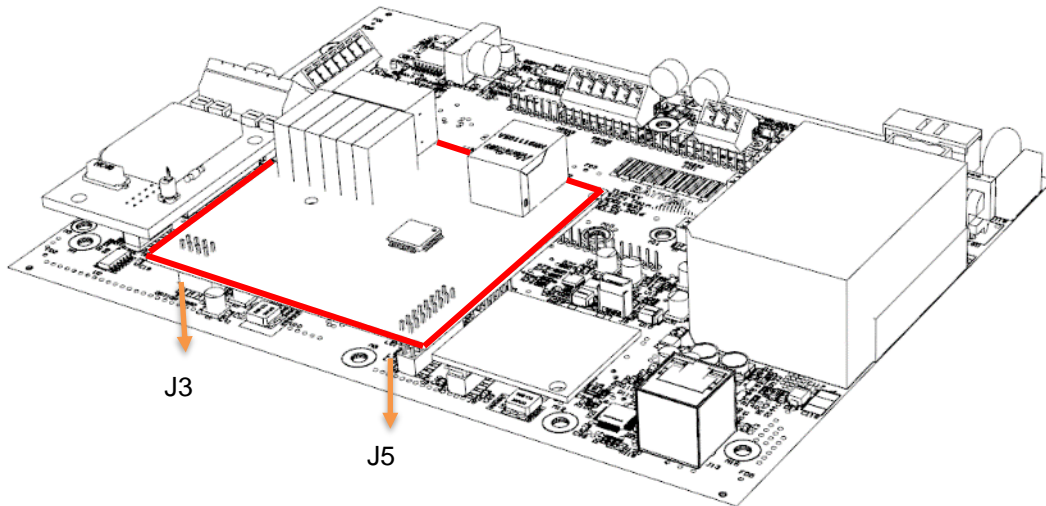


Figure 14.1- The mechanical installation of optional board

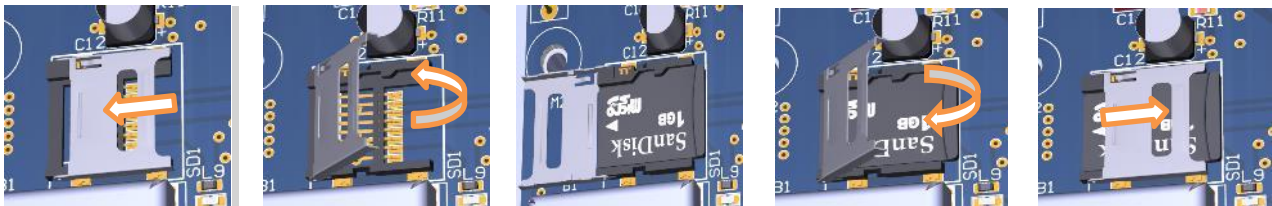
1. De-energize the instrument at mechanical installation of the option and wait 30 seconds before interfering the instrument.
2. Install 11 mm spacer which is supplied together with option board to the M7 nut.
3. Install the option board to the J5 and J3 connectors carefully.
4. Mount the M3 x 6 screw to fix option board to the spacer.
5. Install cables to the option board as described in the related sections.

## 14.1 Installation of SD Card and Alibi Memory Card

Some features of the FT-112 need to be inserted into the SD card. SD1 (Alibi) is located between the load cell terminal and metal box of the analog digital converter. SD2 is located close to the USB connector on the main board. Both SD cards need to be ordered from Flintec. Up to 16 GB standard SD cards can be used for data logging and backup & restore the setup.

### Inserting the SD card

1. Deenergize the instrument and wait 30 seconds.
2. Remove screws of the backplane.
3. Insert the SD card into the slot as shown below. Do not use screwdriver to install SD card.
4. Mount the backplane to the body.
5. Energize the instrument. FT-112 read the SD card at power on to initiate its function.



Unlock the cover

Open the cover

Insert the SD card

Close the cover

Lock the cover

### Removing the SD card

1. Deenergize the instrument.
2. Remove screws of the backplane.
3. Remove the SD card into the slot as shown in the pictures above. Do not use screwdriver to remove SD card.
4. Insert the new SD card as described above if need be.
5. Mount the backplane to the body.
6. Energize the instrument.


## 14.2 Digital Inputs and Outputs

**APPLICATION:** Digital inputs are used to control the instrument and the digital outputs can be used at basic weighing, checkweighing, classifying, packing, and filling applications to control gates, valves etc. or to produce alarm.





**CONDITION:** The Digital I/O option board, analogue output option or one of the fieldbus options should be installed in the weighing terminal, to use digital control inputs and setpoint output signals.

This weighing terminal can be equipped with programmable 4 inputs and 5 outputs to use them at basic weighing or at application. If the specified set point values are exceeded or dropped below at basic weighing, digital outputs are set to control flaps, valves, lamps etc. Digital inputs and outputs are set to their application related functions at classifying, checkweighing, packing, or filling.

In / Out	Weighing/PCS	Classifying	Checkweighing	Filling	Packing
Input 1	Parameter 351	Start	Start	Start	Start
Input 2	Parameter 352	Reset	Reset	Reset	Reset
Input 3	Parameter 353	Parameter 353	Parameter 353	Parameter 353	Parameter 353
Input 4	Parameter 354	Parameter 354	Parameter 354	Parameter 354	Parameter 354
Output 1	Parameter 361	- - Tolerance	- Tolerance	Ready	- Tolerance
Output 2	Parameter 362	- Tolerance	OK	Coarse	OK
Output 3	Parameter 363	OK	+ Tolerance	Fine	+ Tolerance
Output 4	Parameter 364	+ Tolerance	Parameter 364	End of Filling	Parameter 364
Output 5	Parameter 365	+ + Tolerance	Parameter 365	Parameter 365	Parameter 365

Pressing  key more than 2 seconds is used to access the setpoint entry menu. Additionally, one of the function key can be programmed to access setpoint entry menu easily for frequent usage.

### Entry the limit values at basic weighing

1. Press the  key for more than 2 seconds.
2. The setpoint 1 value appears on the display as value is shown on the display [SP 1 1250 kg].
3. Enter the new value by numerical keys. You may press  key to enter negative limit value. Press the  key to save it and to go to the next setpoint.
4. Repeat from step 2 for entering following setpoints.
5. The indicator returns to the operation after displaying setpoint 5 and entering its value,
6. Press  key to return operation at any step.

### 14.2.1 Digital Inputs

FT-112 digital inputs which are independently programmable for zeroing, taring, clear, print, key lock and as a fieldbus input port in basic weighing usage of the weighing terminal. If the instrument is programmed for any SmartAPP application, the inputs are configured for this usage.

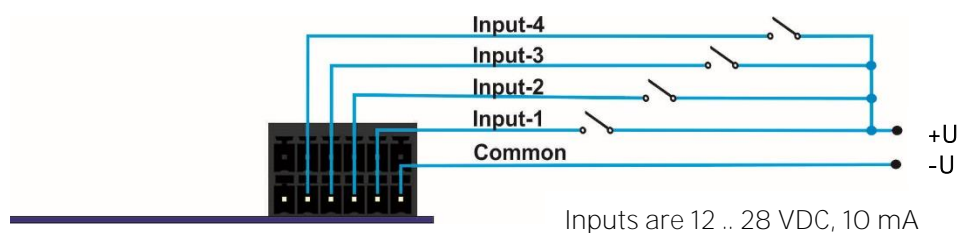
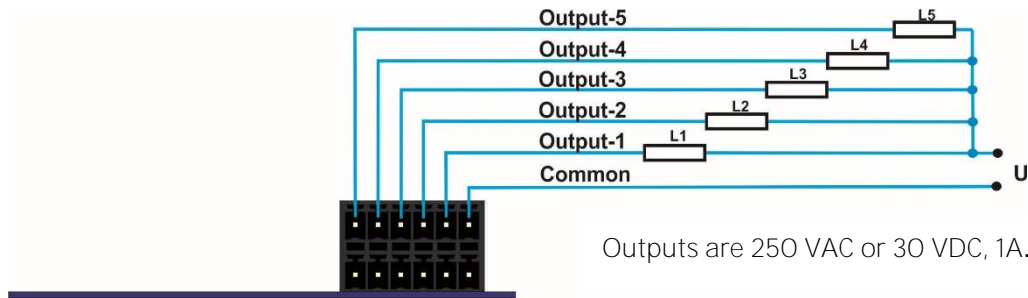


Figure 4-14 - Inputs connection diagram

## 14.2.2 Digital Outputs:

FT-112 instrument's digital outputs can be programmable as a free setpoint or as a dialogue port to control them with host commands.



## 14.3 Analogue Output

**IMPORTANT NOTE:** The analogue output cable should be shielded. Connect the shield to the protective earth as described in the installation section.

FT-112 is programmable to 4 – 20 mA, 0 – 20 mA, 0 – 5 V or 0 – 10 V analogue output types. Analog output is automatically adjusted to the weighing range after the calibration. The mid value of the analogue output is set to zero load at bipolar usage. The manual analogue output adjustment is available in parameter group 19- .

The analogue output is related to the gross load of the scale. The analogue output signal operates as described next.

Under Zero	When the gross indication drops below zero, the analogue output reduces the analogue output to 0mA or - 4 V to indicate error on the analogue output.
Normal Range	The analogue output will reflect the gross value to the programmed analogue output 4 – 20 mA, 0 – 20 mA, 0 – 5 V or 0 – 10 V.
Over High Limit	When the gross value exceeds the high limit, the analogue signal increases to approximately 24 mA or 11 V and remains there until the weight display is no longer blanked or the analogue signal returns to within range.

The following table indicates the analogue output value when the gross indication is out of the range and if there is an error indication on the display.

Condition (On Display)	4-20 mA output	0-20 mA output	0 – 5 V output	0 – 10 V output
The weight is more than the range (Over)	24 mA	24 mA	5.5 V	11 V
The weight is under the zero range (Under)	0 mA	0 mA	-4.0 V	-4.0 V
Error [Err XX]	24 mA	24 mA	5.5 V	11 V
ADC is out of operating range [Adc Out]	24 mA	24 mA	5.5 V	11 V

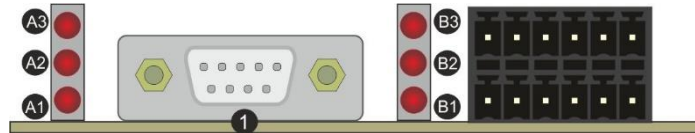
The error data indicated above can be used to diagnose the errors on the PLC.

## 14.4 Profibus DP

In Profibus DPV1 interface, baud rate is detected automatically. Supported baud rates are 9.6 kbps, 19.2 kbps, 45.45 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps, 3 Mbps, 6 Mbps and 12 Mbps. No 'baud rate' instance exists.

After programming Profibus related parameters of the indicator, you can communicate with the instrument. The **GSD** file is available on [www.flintec.com](http://www.flintec.com)

There are LEDs near the Profibus connector which are



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Operation Error LED	B3	Module Error LED		
A2	Not used	B2	Not used		
A1	Operation mode LED	B1	Module Status LED	1	Profibus port

### A1 Operation mode LED

State	Indication	Comment
Off	Not online /No power	Check power and cable
On	On-line, data exchange	-
Flashing	On-line, clear	-

### A3 Operation Error LED

State	Indication	Comment
Off	No error	
Flashing (2 flash)	PROFIBUS configuration error	Check GSD file configuration.

### B1 Module Status LED

State	Indication	Comment
Off	Not power or not initialized	No power or Profibus module is in initialization state
On	Initialized	
Flashing	Initialized, diagnostic event(s) present	Diagnostic is active

### B3 Module Error LED

State	Indication	Comment
Off	No error	
On	Exception error	There is an exception error

### 14.4.1 Electrical Connection

Profibus connection is done as indicated below in Figure 14.2.

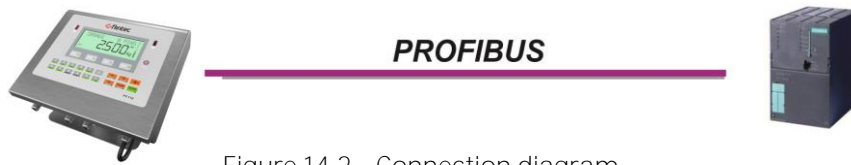


Figure 14.2 - Connection diagram

#### PROFIBUS Connector pin configuration (DB9F)

Pin	Signal	Description
1	-	-
2	-	-
3	B Line	Positive Rx/D / Tx/D, RS-485 level
4	RTS	Request to send
5	GND Bus	Ground (isolated)
6	+5V Bus Output	+5V termination power (isolated)
7	-	-
8	A Line	Negative Rx/D / Tx/D, RS-485 level
9	-	-
Housing	Cable Shield	Ground

### 14.4.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

### 14.4.3 GSD Configuration

Profibus data consist of 2 Input-double-words and 2 Output-double-words like shown in the GSD configuration below.

The screenshot shows the SIMATIC Manager interface. On the left, a hardware rack is visible with slots 1-11. Slot 2 contains a CPU, slot 2.2 contains DP, and slot 2.4 contains Zählen. A PROFIBUS DP-Master system (1) is connected to a DP-NORM module. The main window shows the GSD configuration for the DPV1 module, with a table of data points:

Steckplatz	DP-Kennung	Bestellnummer / Bezeichnung	E-Adresse	A-Adresse	Kommentar
1	209	Input 2 words	50, 53		
2	209	Input 2 words	54, 57		
3	225	Output 2 words		50, 53	
4	225	Output 2 words		54, 57	

Red annotations on the left side of the table indicate:
 

- 1<sup>st</sup> & 2<sup>th</sup> Dword of { (pointing to rows 1 and 2)
- 1<sup>st</sup> & 2<sup>th</sup> Dword of { (pointing to rows 3 and 4)

Figure 14.3 - GSD Configuration

GSD Configuration	Description
Input 2 words	1 <sup>st</sup> Dword (FT-112 Output to PLC Input)
Input 2 words	2 <sup>nd</sup> Dword (FT-112 Output to PLC Input)
Output 2 words	1 <sup>st</sup> Dword (PLC Output to FT-112 Input)
Output 2 words	2 <sup>nd</sup> Dword (PLC Output to FT-112 Input)

#### 14.4.4 Profibus Data Structure

For the Date Structure for Profibus see Apendix 2, **page 155**.



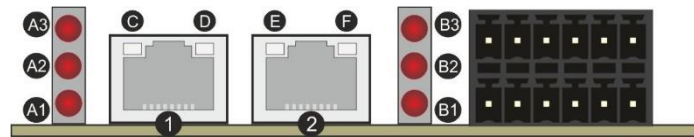
## 14.5 Profinet

Profinet interface of the weighing instrument can be done via hub switch or serial bus over two Profinet ports.

1. Serial bus connection of instruments. You may connect serial instruments to your Profinet bus via two ports.
2. Star connection. If you connect the instrument to your PLC via hub switch, you can use the P1 or P2 port on the instrument. You may change the port, if there is any malfunction on port in use.

The Profinet interface is 100Mbit and full duplex. **GSDML file** for two port Profinet is available on internet [www.flintec.com](http://www.flintec.com).

There are announcement LEDs on the instrument to indicate the interface status as seen below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Not used	B3	Module Error LED	1,2	Interface ports ( P1,P2 )
A2	Not used	B2	Not used	D,F	Not used
A1	Network Status LED	B1	Module Status LED	C,E	Link/Activity LEDs

### A1 Network Status LED

LED State	Description	Comment
Off	Not online /No power	Check power and cable
On	On-line RUN	-
Flashing	On-line STOP	-

### B1 Module Status LED

LED State	Description	Comment
Off	Not power or not initialized	No power or Profinet module is in initialization state
On	Normal operation	
1 flash	Initialized, diagnostic event(s) present	Diagnostic is active

### B3 Module Error LED

LED State	Description	Comment
Off	No Error	
On	Exception error	There is an exception error
1 flash	Configuration Error	Check GSDML configuration
2 flashes	IP Address Error	IP address not set
3 flashes	Device Name Error	Device name not set
4 flashes	Internal Module Error	Re-energize the instrument. If seen again, change the board.

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

## C,E LINK/Activity LED

LED State	Description	Comment
Off	No Link	No link, no communication present
On	Link	Ethernet link established, no communication present
Flickering	Activity	Ethernet link established, communication present

## 14.5.1 Electrical Connection

Profinet connection is done as indicated below in Figure 14.4.



Figure 14.4 - Connection diagram

### PROFINET Connector pin configuration (RJ45)

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data -
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data -
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

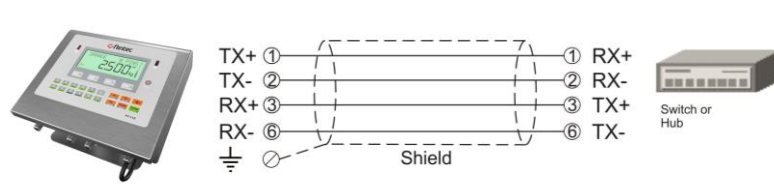


Figure 14.5 - HUB connection

The PC connection cabling will be done via cross-over cable as shown below. IP address blocks and gateway address of weighing terminal and PC should be the same in cross-over connection.

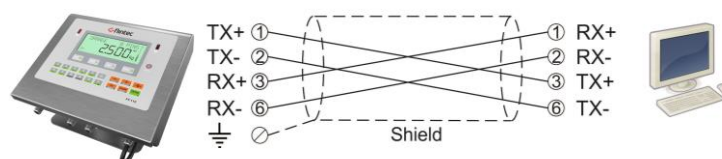


Figure 14.6 - Cross PC connection

## 14.5.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 14.5.3 Profinet Parameters

Profinet parameters can be adjusted by keys in programming mode. Refer to parameter block [ 19- ]. Additionally, Profinet parameters set up is done by EtherX PC software over Local Network Area or by IndFace2x. Both software versions are available on internet [www.flintec.com](http://www.flintec.com).

**Note:** Station name is 'scale-1' as a default. Refer to **parameter 196**.

Parameters	Descriptions
DHCP	Dynamic Host Configuration Protocol automates network parameters if it is enabled.
Host Name	Device name of the instrument. Refer to <b>parameter 196</b> .
IP Address	If DHCP is disabled, obtain IP address manually. Refer to <b>parameter 192</b> .
Gateway	If DHCP is disabled, obtain default gateway manually. Refer to <b>parameter 195</b> .
Subnet Mask	If DHCP is disabled, obtain subnet mask manually. Refer to <b>parameter 194</b> .
Primary DNS	If DHCP is disabled, obtain primary DNS manually. Refer to <b>parameter 199</b> .
Secondary DNS	If DHCP is disabled, obtain secondary DNS manually.
Password	Default password is <b>123456</b> .

## 14.5.4 GSDML Configuration

Profinet data consist of 2 pcs Input-2 words and 2 pcs Output-2 words. GSDML configuration for PLC programmers is shown in Figure 14.7.

The screenshot shows a hardware rack on the left with slots 1-11. Slot 2 contains a CPU, slot 2.2 contains a DP module, and slot 2.4 contains a Zähler. A PROFIBUS DP-Mastersystem (1) is connected to the DP-NORM module. Below the rack is a table for GSDML configuration for 'Anybus CompactCom DPV1'.

Steckplatz	DP-Kennung	Bestellnummer / Bezeichnung	E-Adresse	A-Adresse	Kommentar
1	209	Input 2 words	50, 53		
2	209	Input 2 words	54, 57		
3	225	Output 2 words		50, 53	
4	225	Output 2 words		54, 57	
5					
6					
7					
8					
9					
10					
11					

Red text on the left side of the table indicates: "1 & 2 Dword of PLC Output to BX11PN Input" with arrows pointing to the first two rows of the table.

Figure 14.7 - GSDML Configuration

GSDML Configuration	Description
Input 2 words	1 <sup>st</sup> Dword (FT-112 Output to PLC Input)
Input 2 words	2 <sup>nd</sup> Dword (FT-112 Output to PLC Input)
Output 2 words	1 <sup>st</sup> Dword (PLC Output to FT-112 Input)
Output 2 words	2 <sup>nd</sup> Dword (PLC Output to FT-112 Input)

## 14.5.5 Profinet Data Structure

For the Date Structure for Profibus see Appendix 1, [page 155](#).

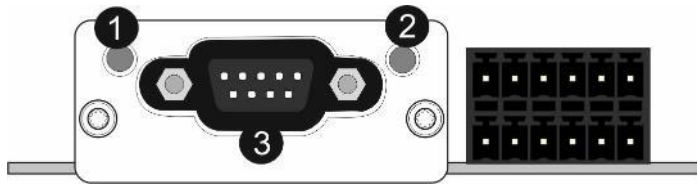
## 14.6 CANopen

Please set the related parameters to enable communication with the indicator via CANopen network.

The EDS file is available on [www.flintec.com](http://www.flintec.com).

Automatically detected and supported baud rates are 10 kbps, 50 kbps, 100 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, 1 Mbps, Autobaud (default).

There are 2 LEDs near the CANopen connector which are



1	RUN LED
2	ERROR LED
3	CANopen interface

### Run LED

State	Indication	Comment
Off	Not online / No power	Check power and cable
Green	On-line, data exchange	-
Green, blinking	On-line, initializing	-
Green, single flash	Stopped	Check for hardware damage
Green, flickering	Auto baudrate detection in progress	-
Red	CANopen configuration error	Check EDS file

### Error LED

State	Indication	Comment
Off	-	No power or CANopen module is in initialization state
Red, single flash	Warning limit reached	A bus error counter has reached or exceeded its warning level
Red, flickering	LSS	LSS services in progress
Red, double flash	Error count event	A guard- (NMT-Slave or NMT-master) or heartbeat event (Heartbeat consumer) has occurred.
Red	Bus off (Fatal Event)	Bus off.

## 14.6.1 Electrical Connection

CANopen connection is done with four wires as indicated below in Figure 14.8. **N.B.** The data line ends must be equipped with 120-ohm bus termination resistors.

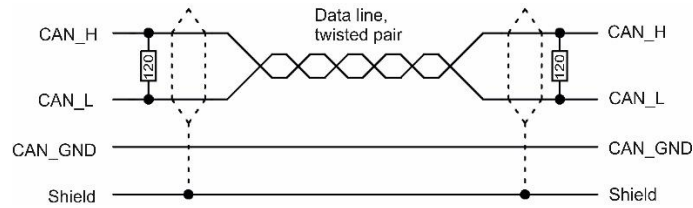


Figure 14.8 - Connection diagram

### CANopen Connector pin configuration (DB9M)

Pin	Signal	Description
1	-	-
2	CAN_L	-
3	CAN_GND	-
4	-	-
5	CAN_SHIELD	-
6	-	-
7	CAN_H	-
8	-	-
9	-	-
Housing	Cable Shield	-

Pin configuration of digital input and output connector is described in section 4.3.17/18.

## 14.6.2 Data Format

Data format of weight value can be programmed for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

### 14.6.3 EDS Configuration

CANopen data structures consist of TxPDO (64 bit) and RxPDO (64 bit). EDS configuration for PLC programmers is shown in Figure 14.9.

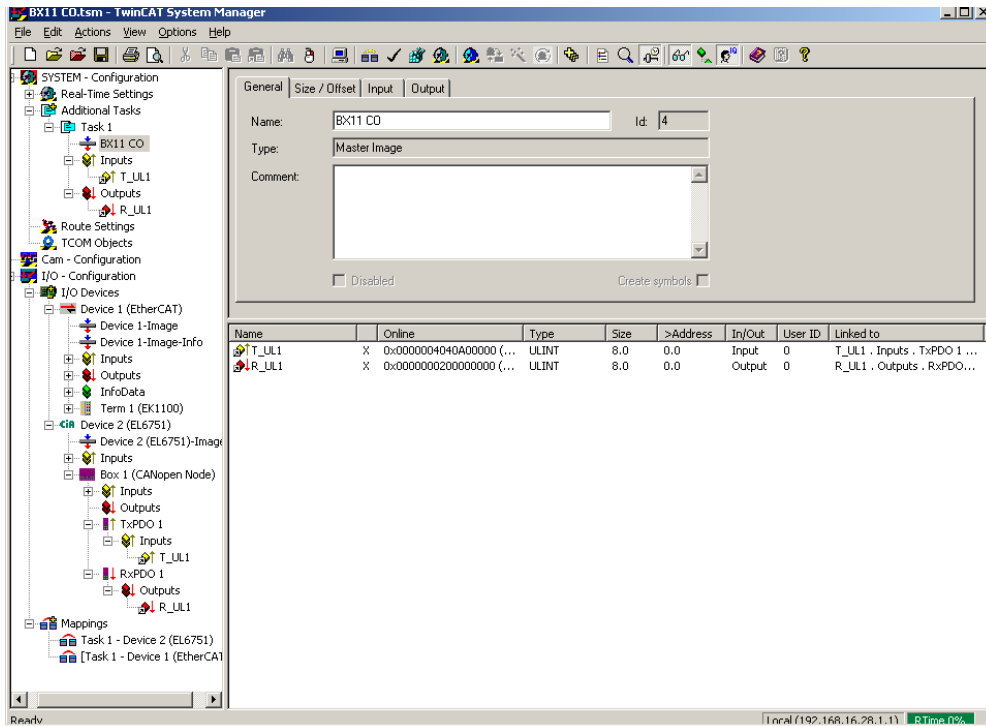


Figure 14.9 - EDS Configuration

EDS Configuration	Description
TxPDO 1 (4 words)	Unsigned Long (FT-112 Output to PLC Input)
RxPDO 1 (4 words)	Unsigned Long (PLC Output to FT-112 Input)

### 14.6.4 CANopen Data Structure

For the Data Structure for CANopen see Appendix 2, **page 155**

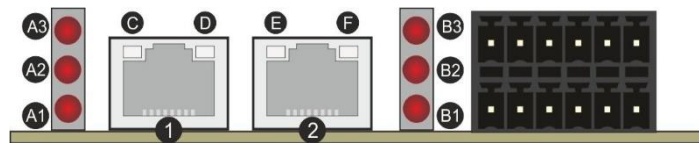
## 14.7 EtherNET/IP

EtherNet/IP interface of the weighing instrument can be connected via hub switch or serial bus over two EtherNet/IP ports.

1. Serial bus connection of instruments. The instrument serial port may be connected to your EtherNet/IP bus via two ports.
2. Star connection. If you connect the instrument to your PLC via hub switch, the P1 or P2 port on the instrument may be used. You may change the port, if there is any malfunction on port in usage.

The EtherNet/IP interface supports 10/100Mbit, full or half duplex operation.  
The **EDS file** for two port EtherNet/IP is available on [www.flintec.com](http://www.flintec.com)

There are announcement LEDs on the instrument to indicate the interface status as shown below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Network Error LED	B3	Module Error LED	1,2	Interface ports ( P1,P2 )
A2	Not used	B2	Not used	E,F	Link/Activity LEDs for P2
A1	Network Status LED	B1	Module Status LED	C,D	Link/Activity LEDs for P1

### A1 Network Status LED

LED State	Description
Off	No IP address
On	Online, one or more connections established (CIP Class 1 or 3)
Flashing	Online, no connections established

### A3 Network Error LED

LED State	Description
Off	No error
On	Duplicate IP address, FATAL error
Flashing	One or more connections timed out (CIP Class 1 or 3)

### B1 Module Status LED

LED State	Description
Off	No power
On	Controlled by a scanner in run state
Flashing	Not configured, or scanner in idle state

### B3 Module Error LED

LED State	Description
Off	No Error
On	Major fault (EXCEPTION state, FATAL error etc.)
Flashing	Recoverable fault(s)

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

C,D,E,F LINK/Activity LED

LED State	Description
Off	No link, no activity
Green	Link (100 Mbit/s) established
Green, flickering	Activity (100 Mbit/s)
Yellow	Link (10 Mbit/s) established
Yellow, flickering	Activity (10 Mbit/s)

### 14.7.1 Electrical Connection

EtherNet/IP connection is done as indicated below in Figure 14.10.

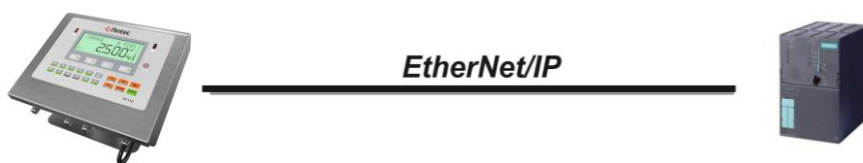


Figure 14.10 - Connection diagram

#### EtherNet/IP Connector pin configuration (RJ45)

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data -
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data -
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

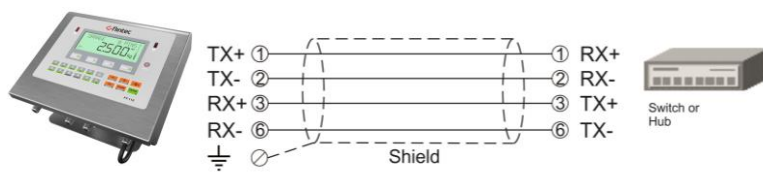


Figure 14.11 - HUB connection

The PC connection cabling will be done via cross-over cable as shown below. IP address blocks and gateway address of weighing terminal and PC should be the same in cross connection.

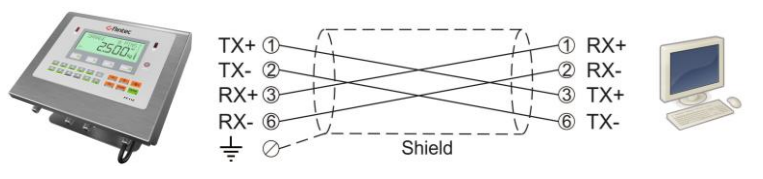


Figure 14.12 - Cross PC connection



## 14.7.2 Data Format

Data format of weight value can be programmed for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 14.7.3 EtherNet/IP Parameters

EtherNet/IP parameters can be adjusted by keys in programming mode. Refer to **parameter block [ 19- ]**. Additionally, EtherNet/IP parameter set up is done by EtherX PC software over Local Network Area or by IndFace2x. Both softwares are available on [www.flintec.com](http://www.flintec.com).

Parameters	Descriptions
Host Name	Device name of the instrument.
DHCP	Dynamic Host Configuration Protocol automates network parameters if it is enabled.
IP Address	If DHCP is disabled, obtain IP address manually. Refer to <b>parameter 192</b> .
Gateway	If DHCP is disabled, obtain default gateway manually. Refer to <b>parameter 195</b> .
Subnet Mask	If DHCP is disabled, obtain subnet mask manually. Refer to <b>parameter 194</b> .
Primary DNS	If DHCP is disabled, obtain primary DNS manually.
Secondary DNS	If DHCP is disabled, obtain secondary DNS manually.
Password	Default password is <b>123456</b> .

## 14.7.4 EDS Configuration

EtherNet/IP data structure consist of 2 Input-double-words and 2 Output-double-words. The EDS configuration for PLC programmers is shown in Figure 14.13 and Figure 14.14.

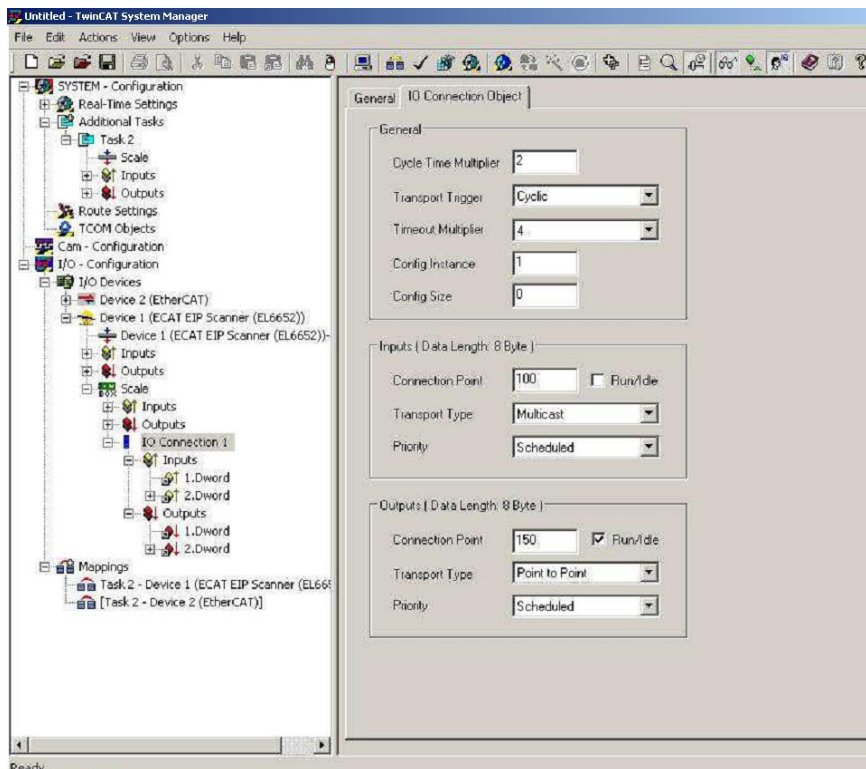


Figure 14.13 – Configuration of module properties without EDS file

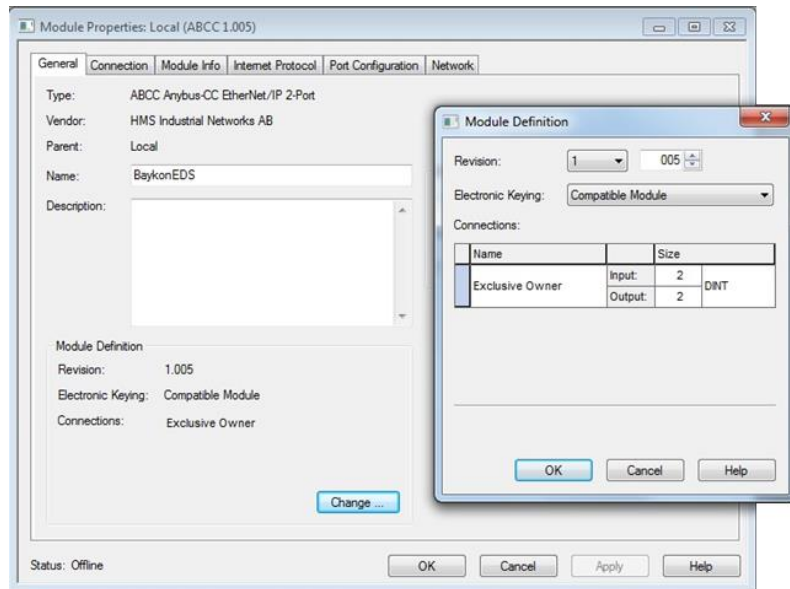


Figure 14.14 – Configuration of module properties with EDS file

Data Length	Description
Input 2 words	1 <sup>st</sup> Dword (FT-112 Output to PLC Input)
Input 2 words	2 <sup>nd</sup> Dword (FT-112 Output to PLC Input)
Output 2 words	1 <sup>st</sup> Dword (PLC Output to FT-112 Input)
Output 2 words	2 <sup>nd</sup> Dword (PLC Output to FT-112 Input)

### 14.7.5 EtherNET/IP Data Structure

For the Date Structure for EtherNET/IP see Appendix 1, **page 155**.

## 14.8 EtherCAT

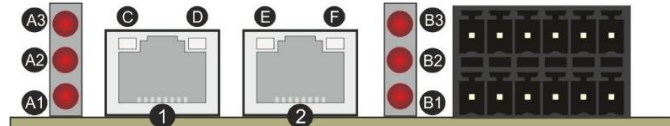
EtherCAT interface of the weighing instrument can be connected via hub switch or serial bus over two ports.

1. Serial bus connection of instruments. You may connect instruments serial to your EtherCAT bus via two ports.
2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 port on the instrument.

The EtherCAT interface supports 100Mbit, full duplex operation.

ESI file for two ports EtherCAT is available on [www.flintec.com](http://www.flintec.com).

There are announcement LEDs on the instrument to indicate the interface status as shown below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Network Error LED	B3	Not used	1,2	Interface ports ( IN, OUT )
A2	Not used	B2	Not used	D,F	Not used
A1	Network Status LED	B1	Module Status LED	C,E	Link/Activity LEDs

### A1 Network Status LED

LED State	Description
Off	INIT
On	OPERATIONAL
Blinking	PRE-OPERATIONAL
Single flash	SAFE-OPERATIONAL

### A3 Network Error LED

LED State	Description
Off	No error
On	(Fatal Event)

### B1 Module Status LED

LED State	Description
Off	No any error ( or no power )
Blinking	Invalid configuration; State change received from master is not possible due to invalid register or object settings.
Single flash	Unsolicited state change; Slave device application has changed the EtherCAT state autonomously.
Double flash	Application watchdog timeout
On	Application controller failure

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

### C,E LINK/Activity LED

LED State	Description
Off	No link, no activity.
Green	Link sensed, no activity.
Green, flickering	Link sensed, activity exist.

## 14.8.1 Electrical Connection

EtherCAT connection is done as indicated below in Figure 14.15.



Figure 14.15 - Connection diagram

### EtherCAT Connector pin configuration (RJ45)

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data -
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data -
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

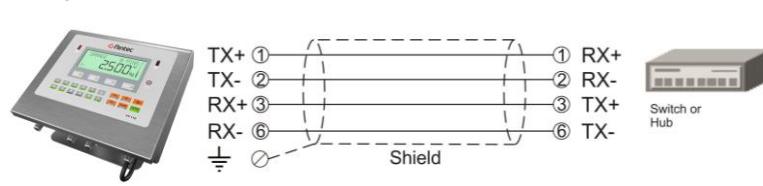


Figure 14.16 - HUB connection

The PC connection cabling will be done via cross-over cable as shown below. IP address blocks and gateway address of weighing terminal and PC should be the same in cross connection.

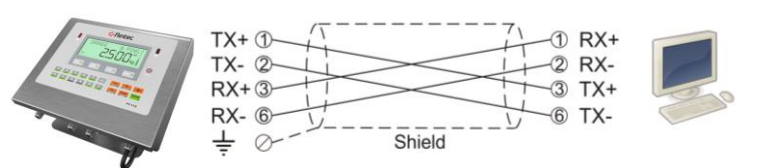


Figure 14.17 - Cross PC connection

## 14.8.2 Data Format

Data format of weight value can be programmed for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

### 14.8.3 ESI Configuration

EtherCAT data structures consist of 2 Input-double-words and 2 Output-double-words. The ESI configuration for PLC programmers is shown in Figure 14.18.

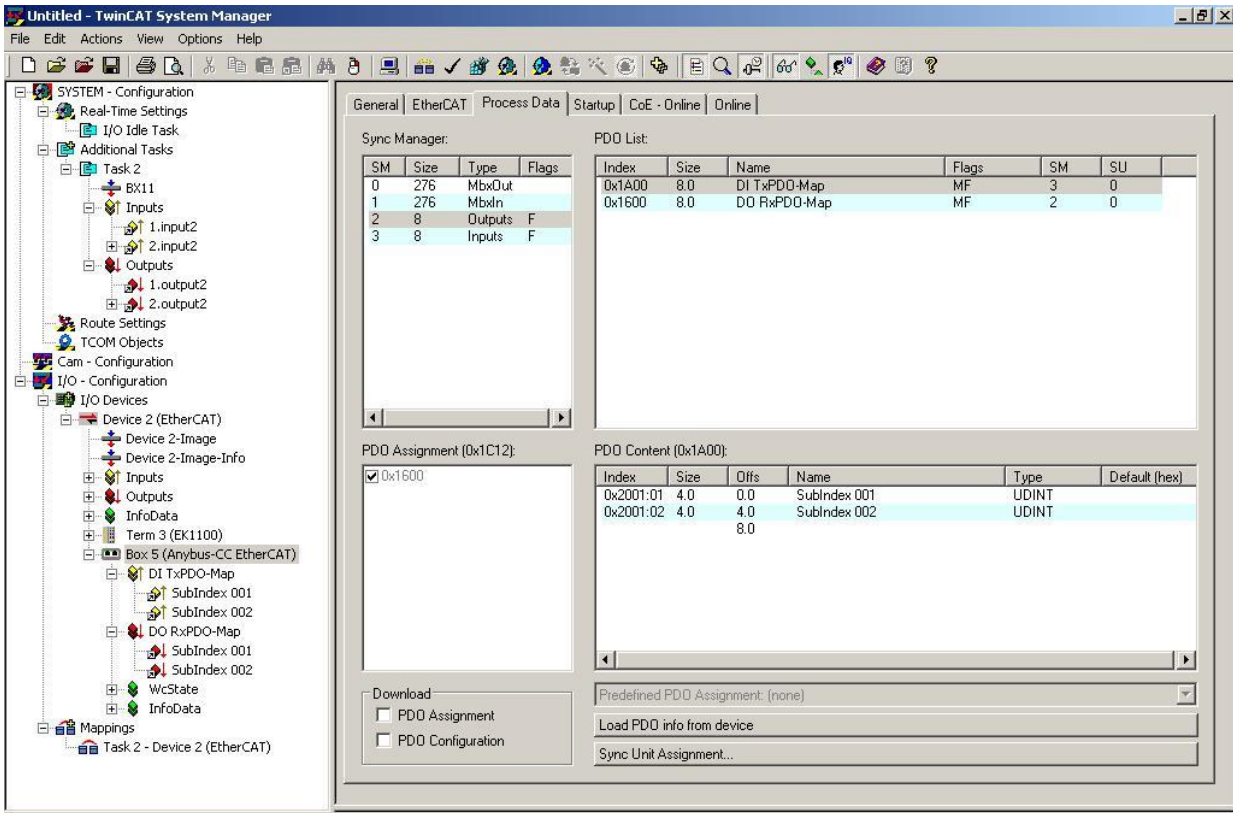


Figure 14.18 – Configuration of module properties for Beckhoff

Input/Output	Definition	Description
DI TxPDO-Map	SubIndex 001	1 <sup>st</sup> Dword ( <i>FT-112 Output to PLC Input</i> )
	SubIndex 002	2 <sup>nd</sup> Dword ( <i>FT-112 Output to PLC Input</i> )
DO RxPDO-Map	SubIndex 001	1 <sup>st</sup> Dword ( <i>PLC Output to FT-112 Input</i> )
	SubIndex 002	2 <sup>nd</sup> Dword ( <i>PLC Output to FT-112 Input</i> )

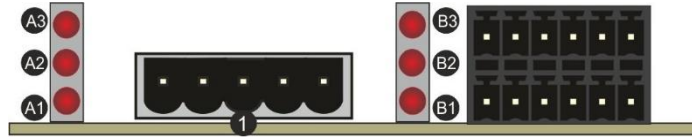
### 14.8.4 EtherCAT Data Structure

For the Date Structure for EtherCAT see Appendix 1, page 155.

## 14.9 CC-Link

Please set the related parameters to be able to communicate with the indicator via CC-Link network. Supported CC-Link version is v1.10 and baud rates are 156 kbps (default), 625 kbps, 2,5 Mbps, 5 Mbps and 10 Mbps.

There are LEDs near the CC-Link connector which are:



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Operation Error LED	B3	Not used		
A2	Not used	B2	Not used		
A1	Operation mode LED	B1	Module Error LED	1	CC-Link port

### A1 Operation mode LED

LED State	Description
Off	No network participation, timeout status (no power)
On	Participating, normal operation

### A3 Operation Error LED

LED State	Description
Off	No error
On	Major fault (FATAL error)

### B1 Module Error LED

LED State	Description
Off	No error detected (no power)
On	Major fault (Exception or FATAL event)
Flickering	CRC error (temporary flickering)
Flashing	Station Number or Baud rate has changed since startup (flashing)

In the case of red LED warning, check cabling, configuration, and station number. Power off the instrument and reenergize the instrument 30 seconds later.

## 14.9.1 Electrical Connection

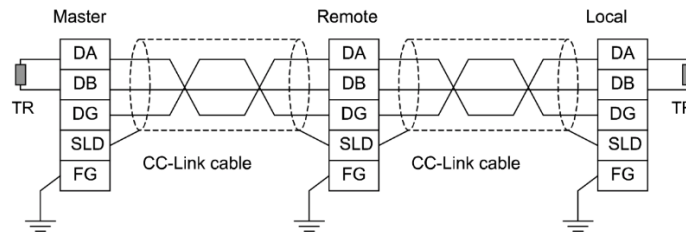
CC-Link connection is done as indicated below in Figure 14.19.



Figure 14.19 - Connection diagram

### CC-Link Connector pin configuration

Pin	Signal	Description
1	DA	PositiveRS485 Rxd/TxD
2	DB	NegativeRS485 Rxd/TxD
3	DG	Signal ground
4	SLD	Cable Shield
5	FG	Protective Earth



## 14.9.2 Data Format

Data format of weight value can be programmable for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

## 14.9.3 CC-Link Configuration

Weighing terminal has one occupied station area on CC-Link network. The station type of weighing terminal must be programmed as 'Remote device station' in the PLC software.

The CC-Link configuration for PLC programmers is shown in Figure 14.20.

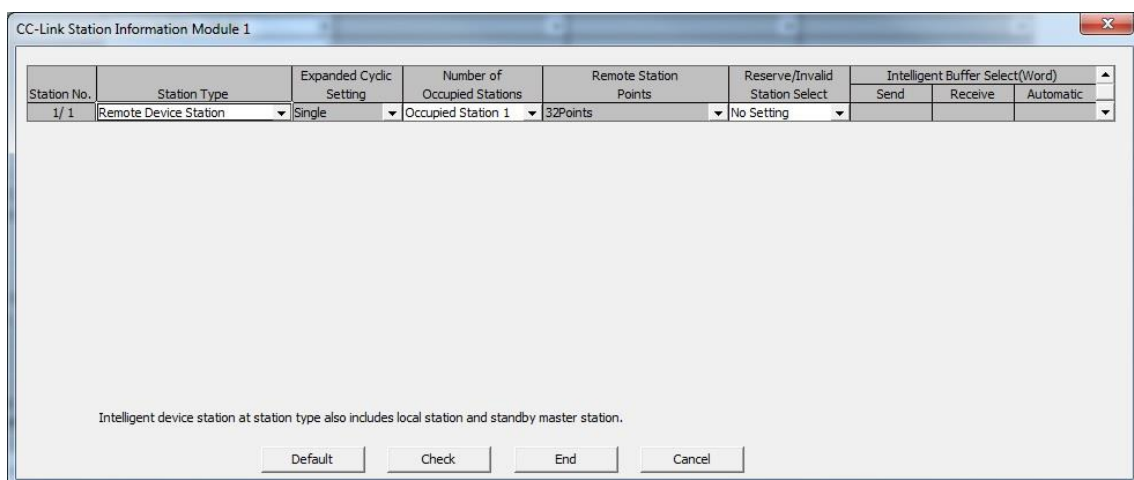


Figure 14.20 – Station information

Input/Output	Definition	Description
Remote Register (RWr)	RWr0, RWr1	1 <sup>st</sup> Dword Input ( <i>FT-112 Output to PLC Input</i> )
	RWr2, RWr3	2 <sup>nd</sup> Dword Input ( <i>FT-112 Output to PLC Input</i> )
Remote Input (RX)	RX0 ~ RX31	Not used
Remote Register (RWw)	RWw0, RWw1	1 <sup>st</sup> Dword Output ( <i>PLC Output to FT-112 Input</i> )
	RWw2, RWw3	2 <sup>nd</sup> Dword Output ( <i>PLC Output to FT-112 Input</i> )
Remote Output (RY)	RY0 ~ RY31	Not used

#### 14.9.4 CC-Link Data Structure

For CC-Link Data Structure see Appendix 1, page 155.



## 14.10 Powerlink

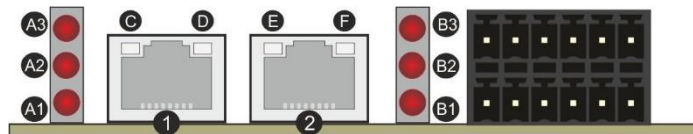
Powerlink interface of the weighing instrument can be connected via hub switch or serial bus over two Powerlink ports.

1. Serial bus connection of instruments. Instruments serial port may be connected to your Powerlink bus via two ports.
2. Star connection. If you connect the instrument to your PLC via hub switch, you can use P1 or P2 port on the instrument. The port may be changed, if there is any malfunction on the port in use.

The Powerlink interface is 100Mbit and half duplex.

The XDD file for two ports Powerlink is available on [www.flintec.com](http://www.flintec.com).

There are announcement LEDs on the instrument to indicate the interface status as shown below.



Ref.	Definition	Ref.	Definition	Ref.	Definition
A3	Network Error LED	B3	Not used	1,2	Interface ports ( IN, OUT )
A2	Not used	B2	Not used	D,F	Not used
A1	Network Status LED	B1	Module Error LED	C,E	Link/Activity LEDs

### A1 Network Status LED

LED State	Description
Off	Module is off, initializing, or not active.
Fast flashing <sup>a</sup>	NMT_CS_BASIC_ETHERNET Basic Ethernet state: no POWERLINK traffic has been detected.
Single flash	NMT_CS_PRE_OPERATIONAL_1. Only asynchronous data.
Double flash	NMT_CS_PRE_OPERATIONAL_2. Asynchronous and synchronous data. No PDO data. <sup>b</sup>
Triple flash	NMT_CS_READY_TO_OPERATE. Ready to operate. Asynchronous and synchronous data. No PDO data. <sup>b</sup>
On	NMT_CS_OPERATIONAL. Fully operational. Asynchronous and synchronous data. PDO data is sent and received.
Slow flashing <sup>c</sup>	NMT_CS_STOPPED Module stopped (for controlled shutdown, for example). Asynchronous and synchronous data. No PDO data. <sup>b</sup>

a. On 50 ms, off 50 ms.

b. Any process data sent is declared not valid and received process data must be ignored in this state.

c. On 200 ms, off 200 ms.

### A3 Network Error LED

LED State	Description
Off	No error
On	If the MODULE ERROR LED also is On, a fatal event was encountered.

## B1 Module Error LED

LED State	Description
Off	No error
On	If the NETWORK ERROR LED is Off, a non-fatal error has been detected. If the NETWORK ERROR LED is On, a fatal event was encountered.

In the case of LED warning, check cabling, configuration, IP address and device name. Power off the instrument and reenergize the instrument 30 seconds later.

## C,E LINK/Activity LED

LED State	Description
Off	No link.
Green	Link, no traffic.
Green, flashing	Link and traffic.

## 14.10.1 Electrical Connection



Figure 14.21 - PLC Connection

### Powerlink Connector pin configuration (RJ45)

Pin	Signal	DIR	Description
1	TX+	Out	Differential Ethernet transmit data +
2	TX-	Out	Differential Ethernet transmit data -
3	RX+	In	Differential Ethernet receive data +
6	RX-	In	Differential Ethernet receive data -
4	Not used		Terminated
5	Not used		Terminated
7	Not used		Terminated
8	Not used		Terminated
	Shield		Chassis ground

The HUB connection cabling will be a direct connection as shown below:

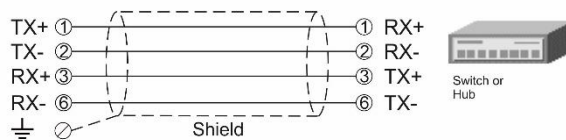


Figure 14.22 - HUB connection

## 14.10.2 Data Format

Data format of weight value can be programmed for Floating point (IEEE 754) or Integer. Refer to parameter [ 191 ].

### 14.10.3 XDD Configuration

Powerlink data structures consist of 2 Input-double-words and 2 Output-double-words. The XDD configuration for PLC programmers is shown in Figure 14.23.

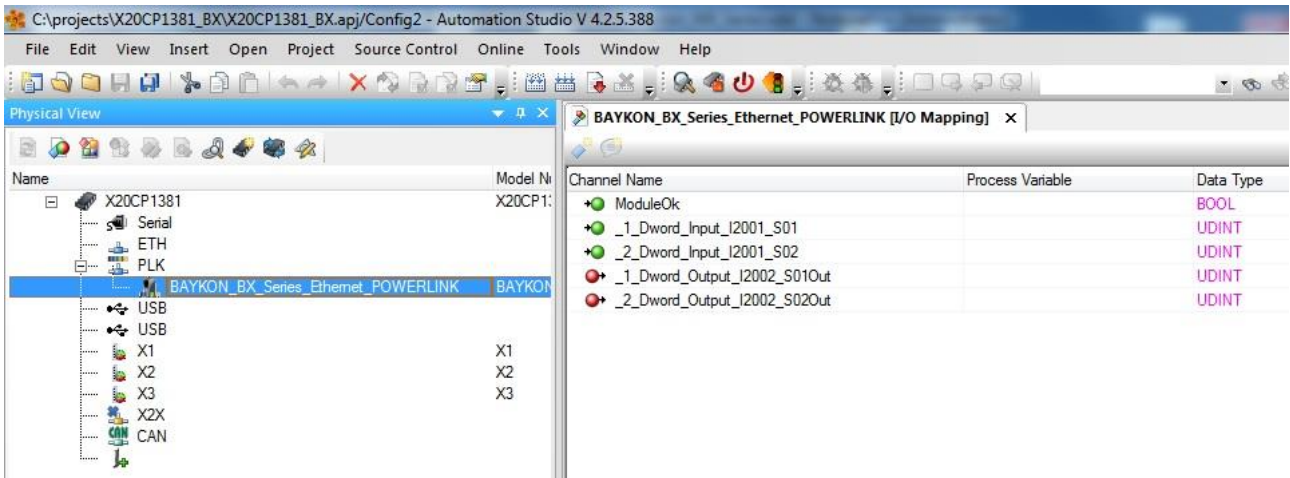


Figure 14.23 – Configuration of module properties with XDD file

Data Length	Description
1_Dword_Input_I2001_S01	1 <sup>st</sup> Dword (FT-112 Output to PLC Input)
2_Dword_Input_I2001_S02	2 <sup>nd</sup> Dword (FT-112 Output to PLC Input)
1_Dword_Output_I2002_S01Out	1 <sup>st</sup> Dword (PLC Output to FT-112 Input)
2_Dword_Output_I2002_S02Out	2 <sup>nd</sup> Dword (PLC Output to FT-112 Input)

### 14.10.4 Powerlink Data Structure

For the Date Structure for Powerlink see Apendix 1, [page 155](#).

# 15 APPENDIX 1: DATA STRUCTURE PROFIBUS, PROFINET, ETHERNET/IP, ETHERCAT, CC-LINK, POWERLINK

## FT-112 Output to PLC Input

Bitwise of a Dword:

Dword (Only read)	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

1st Dword (INPUT) <sup>*1</sup> (RWr0, RWr1) <sup>*2</sup>	By default, Actual weight value is represented. To represent other weight or calibration status, refer to next Dword.															
2nd Dword (INPUT) <sup>*1</sup> (RWr2, RWr3) <sup>*2</sup>				Out 5	Out 4	Out 3	Out 2	Out 1					In 4	In 3	In 2	In 1
	Error codes of FT-112				Unit	C/W modes	P.Tare	Centre of zero	Gross Net	SD	Read command response					Cmd Flg

<sup>\*1</sup> for Profibus, Profinet, EtherNET/IP, EtherCAT, Powerlink

<sup>\*2</sup> for CC-Link

### FT-112 Output to PLC Input 2<sup>nd</sup> Dword

Bit Number	2nd Dword Description			
B31 ... B24	Digital Outputs	Output bit status (Active = 1)		
B23 ... B16	Digital Inputs	Input bit status (Active = 1)		
B15 ... B12	Error Codes of FT-112	Bin	Dec	Descriptions
		0000	0	No error found
		0001	1	ADC out
		0010	2	ADC over
		0011	3	ADC under
		0100	4	System Error
		0101	5	In programming mode
		0110	6	Low/High Voltage Error
B11	Unit	0	1	Descriptions
				First unit Second unit
B10	Counting / Weight modes	0	1	Weight Counting
B9	Preset Tare	0	1	Preset tare is passive Preset tare is active
B8	Centre of zero	0	1	Weight is out of zero range Weight is in zero range
B7	Indication	0	1	Gross Net
B6	Stability Detection	0	1	Stable Unstable
B5 ... B1	Read Command Response	Bin	Dec	Descriptions
		0000 0	0	Actual weight (Net if the indication is in Net)
		00001	1	Gross weight
		00010	2	Tare weight
		00011	3	ALL Status (Refer to Table 15.1)
	00100	4	Calibration Status (Refer to Table 15.2)	

		00101	5	Last print value/pcs			
		00110	6	Quantity of M+			
		00111	7	Not used			
		01010	10				
		01011	11	CN (Label number)			
		01100	12	Totalization of M+			
		01101	13	Grand Total			
		01110	14	Current APW value			
		01111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>
				Set Point-1	Target	Target	Target
		10000	16	Set Point-2	Coarse	Low	--Low
		10001	17	Set Point-3	Fine	High	-Low
		10010	18	Set Point-4	TareMin	Empty	+High
		10011	19	Set Point-5	TareMax	Not used	++High
		10100	20	Not used	Empty	Not used	Empty
		10101	21	Not used			
		11110	30				
		11111	31	Expanded Commands List (Refer to Table 15.3)			
BO	CMD Flag	Toggles		The command is applied successfully			

**ALL Status (always 32 bit integer)**

1<sup>st</sup> Dword (input) descriptions when read command is 'ALL Status'. Refer to 2<sup>nd</sup> Dword of PLC Output to FT-112 Input.

Bit Number	1st Dword (Input) Description	
B31	0	None
	1	No decimal point
B30	0	None
	1	Decimal point is X.X
B29	0	None
	1	Decimal point is X.XX
B28	0	None
	1	Decimal point is X.XXX
B27	0	None
	1	Decimal point is X.XXXX
B26 ... B14	Not in use	
B13	0	Passive
	1	Active
B12	0	Weight is out of zero range
	1	Weight is in zero range
B11	0	Passive
	1	Active
B10	0	Scale is passive
	1	Scale is active
B9	0	Scale is passive
	1	Scale is active
B8	0	Scale is passive
	1	Scale is active
B7	0	Weight mode
	1	Counting mode
B6	0	First Unit (power on unit)
	1	Second Unit
B5	0	Not power on zeroed
	1	Zeroed with power on zero
B4	0	Preset tare is passive
	1	Preset tare is active
B3	0	Gross mode
	1	Net mode
B2	0	Stable
	1	Unstable
B1	0	Weight is actual weight
	1	Weight is dynamic result
B0	0	Dynamic is inactive
	1	Dynamic weight is calculating

Table 15.1– ALL Status table

**Calibration Status (always 32 bit integer)**

1<sup>st</sup> Dword (input) descriptions when read command is 'Calibration Status'. Refer to 2<sup>nd</sup> Dword of PLC Output to FT-112 Input

Bit Number	1st Dword (input) Description	
B31 ... B11	Not in use	
B10	0	No Error
	1	The Calibration DIP switch is not in 'On' position. - Check the calibration DIP switch.
B9	0	No Error
	1	Scale unstable - Wait until scale stabilises - Check grounding wiring
B8	0	No Error
	1	Calibration load value entry Error - Test weight is too small. Increase the weight
B7	0	No Error
	1	Calibration Error - Calibration load is not enough - Check test weight load - Check load cell connections
B6	0	No Error
	1	Instrument cannot be calibrated - Load cell signal is very low or too high
B5	0	No Error
	1	Instrument cannot be calibrated - Check load cell cable - Re-energize the instrument
B4	0	No Error
	1	ADC Error - Re-energize the instrument - If seen again, change the board.
B3	0	No Error
	1	Calibration Timeout - Restart calibration
B2	0	None
	1	Span calibration in process ...
B1	0	None
	1	Zero calibration in process ...
B0	0	Not ready for calibration
	1	Ready for calibration

Table 15.2 - Calibration status

# PLC Output to FT-112 Input

Bitwise of a Dword:

Dword (Only read)	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

1st Dword (OUTPUT) <sup>*1</sup> (RWw0, RWw1) <sup>*2</sup>	Next Dword defines the usage of this Dword.																	
2nd Dword (OUTPUT) <sup>*1</sup> (RWw2, RWw3) <sup>*2</sup>				Out 5	Out 4	Out 3	Out 2	Out 1	Expanded Commands List									
	Not in use				Command List				Read Data Selection				New CMD					

<sup>\*1</sup> for Profibus, Profinet, EtherNET/IP, EtherCAT  
<sup>\*2</sup> for CC-Link

## PLC Output to FT-112 Input 2<sup>nd</sup> Dword

Bit No.	2nd Dword descriptions						
B31 ... B24	Set / Reset digital outputs						
B23 ... B16	Select an item form the Expanded Commands List (Refer to Table 15.3)						
B15 ... B11	Not in use						
B10 ... B6	Command List	Bin	Dec	Commands			
		00000	0	No command is activated			
		00001	1	Zero			
		00010	2	Tare			
		00011	3	Clear			
		00100	4	Print			
		00101	5	Adjust zero calibration		Calibration	
		00110	6	Adjust span calibration <sup>(1)</sup>			
		00111	7	Total Load Cell Capacity <sup>(1)</sup>		eCal Coefficients	
		01000	8	Average mV/V value <sup>(1)</sup>			
		01001	9	Dead Load value <sup>(1)</sup>			
		01010	10	Save the coefficients of eCal			
		01011	11	CN (Label number) <sup>(1)</sup>			Refer to par. [613]
		01100	12	Preset Tare <sup>(1)</sup>			
		01101	13	Grand Total			
		01110	14	Current APW value <sup>(1)</sup>			
		01111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>
				Set Point-1	Target	Target	Target
		10000	16	Set Point-2	Coarse	Low	--Low
		10001	17	Set Point-3	Fine	High	-Low
10010	18	Set Point-4	TareMin	Empty	+High		
10011	19	Set Point-5	TareMax	Not used	++High		
10100	20	Not used	Empty	Not used	Empty		



		10101 11110	21 30	Not used				
		11111	31	Use the Expanded Command list (Refer to Table 15.3)				
B5 ... B1	Read Data Selection	00000	0	Actual weight (Net if the indication is in Net)				
		00001	1	Gross weight				
		00010	2	Tare weight				
		00011	3	ALL Status (Refer to Table 15.1)				
		00100	4	Calibration Status (Refer to Table 15.2)				
		00101	5	Last print value/pcs				
		00110	6	Quantity of M+				
		00111	7	Not used				
		01010	10	Not used				
		01011	11	CN (Label number)				
		01100	12	Totalization of M+				
		01101	13	Grand Total				
		01110	14	Current APW value				
		01111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>	
				Set Point-1	Target	Target	Target	
		10000	16	Set Point-2	Coarse	Low	--Low	
		10001	17	Set Point-3	Fine	High	-Low	
		10010	18	Set Point-4	TareMin	Empty	+High	
		10011	19	Set Point-5	TareMax	Not used	++High	
		10100	20	Not used	Empty	Not used	Empty	
10101 11110	21 30	Not used						
11111	31	Use the Expanded Command list (Refer to Table 15.3)						
B0	New CMD	Toggle		Apply commands which are listed in this table.				

(1) Write this command after writing values to 1<sup>st</sup> Dword, then apply this command with New CMD

### Expanded Command List

Here 1<sup>st</sup> Dword (Input) is the data receiving from PLC and the "D23 ... D16" bits describe below.

Bit No	Description						
B23...B1 6	Expanded Commands List	Bin	Dec	Commands			
		00000000 0	0	R	Voltage of Power Supply <sup>(2)</sup> The value is indicated with 0.1 VDC increment for DC variant or 1 VAC increment for AC variant.		
		00000001	1	R	Load cell millivolt value <sup>(2)</sup> Millivolt of active scale is indicated with 0.01 mV increment.		
		00000010	2	R	Command status <sup>(2)</sup>	Dec	Descr. of 1st Dword
						0	None
						1	Command is processing
						2	Command is done
		00000011	3	R/W	Reprint the last label <sup>(1) (2)</sup>	0	None
						1	Reprint the last label
		00000100	4	R/W	High resolution <sup>(1)</sup> <sup>(2)</sup>	0	Enable
						1	Disable
		00000101	5	W	Unit change <sup>(1)</sup>	0	From first to second unit
						1	From second to first unit
		00000110	6	R/W	Key lock <sup>(1) (2)</sup>	0	Enable
1	Disable						
00000111	7	W	Dynamic operation <sup>(1)</sup>	0	Dynamic reset		
				1	Dynamic start		
00001000	8	W	Totalization	0	None		

			operation <sup>(1)</sup>	1	M+ key
				2	Totalization Print
				3	Totalization Cancel
00001001	9	W	SmartAPP operation <sup>(1)</sup>	0	Reset
				1	Start
00001010	10	R/W	Scale switch <sup>(1)(2)</sup>	0	None
				1	Switch to 1.Scale
				2	Switch to 2.Scale
				3	Switch to summing scale
00001011	11	W	Operation mode <sup>(1)</sup>	0	Switch to weight mode
				1	Switch to counting mode
00001100	12	Not used			
00001101	13				
				0	None
				1	Read stable weight and Record to Alibi
00001110	14	R/W	Alibi operation <sup>(1)(2)</sup>	2	Alibi number
				3	Net weight
				4	Tare weight
				5	Gross weight
00001111	15	No used			
00111110	62				
00111111	63	R/W	Dynamic filter <sup>(1)(2)</sup>	Refer to par. 332 page 59	
				0	No
				1	Very Low
01000000	64	R/W	Filter <sup>(1)(2)</sup>	2	Low
				3	Medium
				4	High
				5	Very High
				0	Disable
01000001	65	R/W	Power on zero <sup>(1)(2)</sup>	1	± %2
				2	± %2LK
				3	± %10
				4	+ %15, - %5
				5	± %20
				0	Disable
01000010	66	R/W	Zeroing Range <sup>(1)(2)</sup>	1	± 2%
				2	± 3%
				3	± 20%
				4	± 50%
				0	Disable
01000011	67	R/W	Auto Zero Tracking <sup>(1)(2)</sup>	1	± 0,3d
				2	± 0,5d
				3	± 1d
				4	± 2d
				5	± 3d
				0	No
01000100	68	R/W	Tare <sup>(1)(2)</sup>	1	Multi tare
				2	Tare only at gross
				3	Preset tare
				4	Preset tare at gross
				0	± 0,3d
01000101	69	R/W	Stability Detection Range <sup>(1)(2)</sup>	1	± 0,5d
				2	± 1d
				3	± 2d
				4	± 3d
				5	± 4d
				6	Disable

		01000110	70	R/W	Stability Time <sup>(1)(2)</sup>	Refer to par. [517] page 64	
		01000111	71	R/W	Unit <sup>(1)(2)</sup>	0	g
						1	kg
						2	t
						3	lb
						4	oz
		5	No				
		01001000	72	R/W	Range <sup>(1)(2)</sup>	0	Single range
						1	2 x Multi Range
						2	3 x Multi Range
						3	2 x Multi Interval
						4	3 x Multi Interval
		01001001	73	R/W	Capacity-1 <sup>(1)(2)</sup>	Refer to par. 523 on page 65	
		01001010	74	R/W	Decimal point-1 <sup>(1)(2)</sup>	0	XXXXOO
						1	XXXXXO
						2	XXXXXX
						3	XXXXX.X
						4	XXXX.XX
		5	XXX.XXX				
		01001011	75	R/W	Increment-1 <sup>(1)(2)</sup>	1	X1
						2	X2
						3	X5
		01001100	76	R/W	Capacity-2 <sup>(1)(2)</sup>		
		01001101	77	R/W	Decimalpoint-2 <sup>(1)(2)</sup>		
		01001110	78	R/W	Increment-2 <sup>(1)(2)</sup>		
		01001111	79	R/W	Capacity-3 <sup>(1)(2)</sup>		
		01010000	80	R/W	Decimalpoint-3 <sup>(1)(2)</sup>		
		01010001	81	R/W	Increment-3 <sup>(1)(2)</sup>		
		01010010	82	R/W	Limit of Indication <sup>(1)(2)</sup>	0	Over indication after Max
						1	1 division more than Max
						2	9 division more than Max
						3	2% more than Max
						4	5% more than Max
		01010011	83		Not Used		
		01011111	95				
		01100000	96	R/W	APPLICA <sup>(1)(2)</sup> Refer to par. 311 page 57	0	No
						1	CHEC
						2	CLAS
						3	FILL
		01100001	97	R/W	LIMITS <sup>(1)(2)</sup> Refer to par. 312 page 57	0	VAL
						1	TOL
						2	%
		01100010	98	R/W	INFODIS <sup>(1)(2)</sup> Refer to par. 313 page 57	0	No
						1	ID1T
						2	ID2T
		01100011	99	R/W	DISPLAY <sup>(1)(2)</sup> Refer to par. 314 page 57	0	No
						1	BAR
						2	COLO
						3	ALL
		01100100	100	R/W	COLORS <sup>(1)(2)</sup> Refer to par. 315 page 57	0	RAAY
						1	YAAR
						2	RBAY
		01100101	101	R/W	CHANGE <sup>(1)(2)</sup> Refer to par. 316 page 57	0	STAB
						1	IMME
		01100110	102	R/W	ACOUSTI <sup>(1)(2)</sup> Refer to par.	0	No
						1	OKAY

					317 page 57	2	OVER
						3	CROSS
		01100111	103	R/W	START <sup>(1)</sup> <sup>(2)</sup> Refer to par. 321 page 58	0	AUTO
						1	MANU
						2	SAUT
						3	PORT
		01101000	104	R/W	FILLING <sup>(1)</sup> <sup>(2)</sup> Refer to par. 322 page 58	0	GROS
						1	NET
		01101001	105	R/W	TAREDELA <sup>(1)</sup> <sup>(2)</sup>	Refer to par. 323 on page 58	
		01101010	106	R/W	TOTAL <sup>(1)</sup> <sup>(2)</sup> Refer to par. 324 page 58	0	No
						1	HORI
						2	VERT
		01101011	107	R/W	GT ERASE <sup>(1)</sup> <sup>(2)</sup> Refer to par. 325 page 58	0	MRC
						1	PASS
		01101100	108	R/W	OUTPUTS <sup>(1)</sup> <sup>(2)</sup> Refer to par. 326 page 58	0	STAB
						1	IMME
		01101101	109	R/W	Not used		
		01101110	110	R/W	PACKING TYPE <sup>(1)</sup> <sup>(2)</sup> Refer to par. 327 page 58	0	GROS
						1	TARE
						2	PT
						3	TAKE
						4	SDNW

Table 15.3 - Expanded Command List

- (1) Write this command after writing values to 1<sup>st</sup> Dword (Output) then apply this command with New CMD.  
(2) To access the related value, read 1<sup>st</sup> Dword (Input).

## Programming steps of frequent use

Reading a weight value:

1. Check the B12...B15 bits of 'FT-112 Output to PLC Input 2<sup>nd</sup> Dword'.
2. If there is no error, read a weight value (gross, net or tare).

Zero Calibration procedure:

1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
2. Write 'Adjust Zero Calibration' command and apply New CMD to start Zero calibration.
3. Check the Bit-1 of Calibration Status. it is '1'(set) during zero calibration process.
4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Zero calibration.
5. If the Bit-3~Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

Span Calibration procedure:

1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
2. Write 'Adjust Span Calibration' command after writing test weight values to 1<sup>st</sup> Dword, then apply this command with New CMD to start Span calibration.
3. Check the Bit-1 of Calibration Status. it is '1'(set) during span calibration process.
4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Span calibration.
5. If the Bit-3~Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

# 16 APPENDIX 2: DATA STRUCTURE– CANOPEN

## FT-112 Output to PLC Input

Bitwise of a Dword:

Unsigned Long (Only read)	B63	B62	B61	B60	B59	B58	B57	B56	B55	B54	B53	B52	B51	B50	B49	B48
	B47	B46	B45	B44	B43	B42	B41	B40	B39	B38	B37	B36	B35	B34	B33	B32
	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

TxPDO 1 (T_UL1)				Out 5	Out 4	Out 3	Out 2	Out 1					In 4	In 3	In 2	In 1
	Error codes of FT-112				Unit	C/W modes	P.Tare	Centre of zero	Gross Net	SD	Read command response					Cmd Flg
	By default, Actual weight value is represented. To represent other weight or calibration status, refer to D33...D37.															

### FT-112 Output to PLC Input 2<sup>nd</sup> Dword

Bit Number	TxPDO 1 (T_UL1) Description			
B63 ... B56	Digital Outputs	Output bit status (Active = 1)		
B55 ... B48	Digital Inputs	Input bit status (Active = 1)		
B47 ... B44	Error Codes	Bin	Dec	Descriptions
		0000	0	No error found
		0001	1	ADC out
		0010	2	ADC over
		0011	3	ADC under
		0100	4	System Error
		0101	5	In programming mode
		0110	6	Low/High Voltage Error
B43	Unit	0		First unit
		1		Second unit
B42	Counting / Weight modes	0		Weight
		1		Counting
B41	Preset Tare	0		Preset tare is passive
		1		Preset tare is active
B40	Centre of zero	0		Weight is out of zero range
		1		Weight is in zero range
B39	Indication	0		Gross
		1		Net
B38	Stability Detection	0		Stable
		1		Unstable
B37 ... B33	Read Command Response	Bin	Dec	Descriptions
		0000 0	0	Actual weight (Net if the indication is in Net)
		00001	1	Gross weight
		00010	2	Tare weight
		00011	3	ALL Status (Refer to Table 15.1)
		00100	4	Calibration Status (Refer to Table 15.2)
		00101	5	Last print value/pcs
		00110	6	Quantity of M+
00111 01010	7 10	Not used		

		O1011	11	CN (Label number)			
		O1100	12	Totalization of M+			
		O1101	13	Grand Total			
		O1110	14	Current APW value			
		O1111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>
				Set Point-1	Target	Target	Target
		10000	16	Set Point-2	Coarse	Low	--Low
		10001	17	Set Point-3	Fine	High	-Low
		10010	18	Set Point-4	TareMin	Empty	+High
		10011	19	Set Point-5	TareMax	Not used	++High
		10100	20	Not used	Empty	Not used	Empty
		10101	21	Not used			
		11110	30				
		11111	31	Use the Expanded Command list (Refer to Table 16.3)			
B32	CMD Flag	Toggles		The command is applied successfully			
B31...B0	By default, Actual weight value is represented. To represent other weight or calibration status, refer to D33...D37.						

**ALL Status (always a 32bit Integer)**

Low Dword of TxPDO 1(T\_UL1) descriptions when read command is 'ALL Status'. Refer to RxPDO 1(R\_UL1) of PLC Output to FT-112 Input.

Bit Number	Low Dword of TxPDO 1(T_UL1) Description	
B31	0	None
	1	No decimal point
B30	0	None
	1	Decimal point is X.X
B29	0	None
	1	Decimal point is X.XX
B28	0	None
	1	Decimal point is X.XXX
B27	0	None
	1	Decimal point is X.XXXX
B26 ... B14	Not in use	
B13	0	Passive
	1	Active
B12	0	Weight is out of zero range
	1	Weight is in zero range
B11	0	Passive
	1	Active
B10	0	Scale is passive
	1	Scale is active
B9	0	Scale is passive
	1	Scale is active
B8	0	Scale is passive
	1	Scale is active
B7	0	Weight mode
	1	Counting mode
B6	0	First Unit (power on unit)
	1	Second Unit
B5	0	Not power on zeroed
	1	Zeroed with power on zero
B4	0	Preset tare is passive
	1	Preset tare is active
B3	0	Gross mode
	1	Net mode
B2	0	Stable
	1	Unstable
B1	0	Weight is actual weight
	1	Weight is dynamic result
B0	0	Dynamic is inactive
	1	Dynamic weight is calculating

Table 16-1– ALL Status table



**Calibration Status (always a 32bit integer)**

Low Dword of TXPDO 1(T\_UL1) descriptions when read command is 'Calibration Status'. Refer to RxPDO 1(R\_UL1) of PLC Output to FT-112 Input.

Bit Number	Low Dword of TxPDO 1(T_UL1) Description	
B31 ... B11	Not in use	
B10	0	No Error
	1	The Calibration DIP switch is not in 'On' position. - Check the calibration DIP switch.
B9	0	No Error
	1	Scale unstable - Wait until scale becomes stable - Check grounding wiring
B8	0	No Error
	1	Calibration load value entry Error - Test weight is too small. Increase the weight
B7	0	No Error
	1	Calibration Error - Calibration loading is not enough - Check test weight loading - Check load cell connections
B6	0	No Error
	1	Instrument cannot be calibrated - Load cell signal is very low or too high
B5	0	No Error
	1	Instrument cannot be calibrated - Check load cell cable - Re-energize the instrument
B4	0	No Error
	1	ADC Error - Re-energize the instrument - If it appears again, change the board.
B3	0	No Error
	1	Calibration Timeout - Restart calibration
B2	0	None
	1	Span calibration in process ...
B1	0	None
	1	Zero calibration in process ...
B0	0	Not ready for calibration
	1	Ready for calibration

Table 16.2 - Calibration status

# PLC Output to FT-112 Input

Bitwise of a Dword:

Unsigned Long (Only read)	B63	B62	B61	B60	B59	B58	B57	B56	B55	B54	B53	B52	B51	B50	B49	B48
	B47	B46	B45	B44	B43	B42	B41	B40	B39	B38	B37	B36	B35	B34	B33	B32
	B31	B30	B29	B28	B27	B26	B25	B24	B23	B22	B21	B20	B19	B18	B17	B16
	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

RxPDO 1 (R_UL1)				Out 5	Out 4	Out 3	Out 2	Out 1	Expanded Commands List						
	Not in use				Command List				Read Data Selection				New CMD		
	B33-B37 bits defines the usage of this Dword.														

## PLC Output to FT-112 Input RxPDO 1 (R\_UL1)

Bit Number	RxPDO 1 (R_UL1) descriptions						
B63 ... B56	Set / Reset digital outputs						
B55 ... B48	Expanded Commands List (Refer to Table 16.3)						
B47 ... B43	Not in use						
B42 ... B38	Command List	Bin	Dec	Commands			
		00000	0	No command is activated			
		00001	1	Zero			
		00010	2	Tare			
		00011	3	Clear			
		00100	4	Print			
		00101	5	Adjust zero calibration		Calibration	
		00110	6	Adjust span calibration <sup>(1)</sup>			
		00111	7	Total Load Cell Capacity <sup>(1)</sup>		eCal Coefficients	
		01000	8	Average mV/V value <sup>(1)</sup>			
		01001	9	Dead Load value <sup>(1)</sup>			
		01010	10	Save the coefficients of eCal		Refer to par. [613]	
		01011	11	CN (Label number) <sup>(1)</sup>			
		01100	12	Preset Tare <sup>(1)</sup>			
		01101	13	Grand Total			
		01110	14	Current APW value <sup>(1)</sup>			
		01111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>
				Set Point-1	Target	Target	Target
		10000	16	Set Point-2	Coarse	Low	--Low
		10001	17	Set Point-3	Fine	High	-Low
		10010	18	Set Point-4	TareMin	Empty	+High
10011	19	Set Point-5	TareMax	Not used	++High		
10100	20	Not used	Empty	Not used	Empty		
10101	21	Not used					
11110	30						

		11111	31	Use the Expanded Command list (Refer to Table 16.3)				
B37 ... B33	Read Data Selection	00000	0	Actual weight (Net if the indication is in Net)				
		00001	1	Gross weight				
		00010	2	Tare weight				
		00011	3	ALL Status (Refer to Table 15.1)				
		00100	4	Calibration Status (Refer to Table 15.2)				
		00101	5	Last print value/pcs				
		00110	6	Quantity of M+				
		00111	7	Not used				
		01010	10					
		01011	11	CN (Label number)				
		01100	12	Totalization of M+				
		01101	13	Grand Total				
		01110	14	Current APW value				
		01111	15	<b>Basic weighing</b>	<b>Filling</b>	<b>Checkweighing</b>	<b>Classifying</b>	
				Set Point-1	Target	Target	Target	
		10000	16	Set Point-2	Coarse	Low	--Low	
		10001	17	Set Point-3	Fine	High	-Low	
		10010	18	Set Point-4	TareMin	Empty	+High	
		10011	19	Set Point-5	TareMax	Not used	++High	
		10100	20	Not used	Empty	Not used	Empty	
10101	21	Not used						
11110	30							
11111	31	Use the Expanded Command list (Refer to Table 16.3)						
B32	New CMD	Toggle		Apply commands which are listed in this table.				
B31-B0	D33-D37 bits defines the usage of this Dword.							

(1) Write this command after writing values to Low Dword of RxPDO then apply this command with New CMD.

Expanded Command List

The "B48...B55" bits in RxPDO describes below.

Bit No	Description										
B55...B48	Expanded Commands List	Bin	Dec	Commands							
		00000000	0	R	Voltage of Power Supply <sup>(2)</sup> The value is indicated with 0.1 VDC increment for DC variant or 1 VAC increment for AC variant.						
		00000001	1	R	Load cell millivolt value <sup>(2)</sup> Millivolt of active scale is indicated with 0.01 mV increment.						
		00000010	2	R	Command status <sup>(2)</sup>	Dec	Descr. of 1st Dword				
						0	None				
						1	Command is processing				
						2	Command is done				
		00000011	3	R/W	Reprint the last label <sup>(1) (2)</sup>	0	None				
						1	Reprint the last label				
						00000100	4	R/W	High resolution <sup>(1) (2)</sup>	0	Enable
										1	Disable
		00000101	5	W	Unit change <sup>(1)</sup>	0	From first to second unit				
						1	From second to first unit				
		00000110	6	R/W	Key lock <sup>(1) (2)</sup>	0	Enable				
						1	Disable				
		00000111	7	W	Dynamic operation <sup>(1)</sup>	0	Dynamic reset				
						1	Dynamic start				
		00001000	8	W	Totalization operation <sup>(1)</sup>	0	None				
						1	M+ key				
						2	Totalization Print				
						3	Totalization Cancel				
		00001001	9	W	SmartAPP operation <sup>(1)</sup>	0	Reset				
						1	Start				
		00001010	10	R/W	Scale switch <sup>(1) (2)</sup>	0	None				
						1	Switch to Scale 1.				
						2	Switch to Scale 2.				
						3	Switch to summing scale				
		00001011	11	W	Operation mode <sup>(1)</sup>	0	Switch to weight mode				
						1	Switch to counting mode				
		00001100	12	Not used							
		00001101	13	Not used							
		00001110	14	R/W	Alibi operation <sup>(1) (2)</sup>	0	None				
1	Read stable weight and Record to Alibi										
2	Alibi number										
3	Net weight										
4	Tare weight										
5	Gross weight										
00001111	15	Not used									
00111110	62	Not used									
00111111	63	R/W	Dynamic filter <sup>(1) (2)</sup>	Refer to par. 332 page 59							
01000000	64	R/W	Filter <sup>(1) (2)</sup>	0	No						
				1	Very Low						
				2	Low						
				3	Medium						
				4	High						
				5	Very High						
01000001	65	R/W	Power on zero <sup>(1) (2)</sup>	0	Disable						
				1	± %2						
				2	± %2LK						



		01010010	82	R/ W	Limit of Indication <sup>(1) (2)</sup>	0	Over indication after Max
						1	1 division more than Max
						2	9 division more than Max
						3	2% more than Max
						4	5% more than Max
		01010011 01011111	83 95		Not Used		
		01100000	96	R/ W	APPLICA <sup>(1) (2)</sup> Refer to par. 311 page 57	0	No
						1	CHEC
						2	CLAS
						3	FILL
		01100001	97	R/ W	LIMITS <sup>(1) (2)</sup> Refer to par. 312 page 57	0	VAL
						1	TOL
						2	%
		01100010	98	R/ W	INFODIS <sup>(1) (2)</sup> Refer to par. 313 page 57	0	No
						1	ID1T
						2	ID2T
		01100011	99	R/ W	DISPLAY <sup>(1) (2)</sup> Refer to par. 314 page 57	0	No
						1	BAR
						2	COLO
						3	ALL
		01100100	100	R/ W	COLORS <sup>(1) (2)</sup> Refer to par. 315 page 57	0	RAAY
						1	YAAR
						2	RBAY
						3	YABR
		01100101	101	R/ W	CHANGE <sup>(1) (2)</sup> Refer to par. 316 page 57	0	STAB
						1	IMME
		01100110	102	R/ W	ACOUSTI <sup>(1) (2)</sup> Refer to par. 317 page 57	0	No
						1	OKAY
						2	OVER
						3	CROSS
		01100111	103	R/ W	START <sup>(1) (2)</sup> Refer to par. 321 page 58	0	AUTO
						1	MANU
						2	SAUT
						3	PORT
		01101000	104	R/ W	FILLING <sup>(1) (2)</sup> Refer to par. 322 page	0	GROS
						1	NET
		01101001	105	R/ W	TAREDELA <sup>(1) (2)</sup>	Refer to par. 323 on page 58	
		01101010	106	R/ W	TOTAL <sup>(1) (2)</sup> Refer to par. 324 page 58	0	No
						1	HORI
						2	VERT
		01101011	107	R/ W	GT ERASE <sup>(1) (2)</sup> Refer to par. 325 page 58	0	MRC
						1	PASS
		01101100	108	R/ W	OUTPUTS <sup>(1) (2)</sup> Refer to par. 326 page 58	0	STAB
						1	IMME
		01101101	109	R/ W	Not used		
		01101110	110	R/ W	PACKING TYPE <sup>(1) (2)</sup> Refer to par. 327 page 58	0	GROS
						1	TARE
						2	PT
						3	TAKE
						4	SDNW

Table 16.3 - Expanded Command List

(1) Write this command after writing values to Low Dword of RxPDO then apply this command with New CMD.

(2) To access the related value, read Low Dword of TxPDO.

### Programming steps of frequent use ...

#### Reading a weight value:

1. Check the B47...B44 bits of TxPDO 1 (T\_UL1).
2. If there is not any error, read a weight value (gross, net or tare).

#### Zero Calibration procedure:

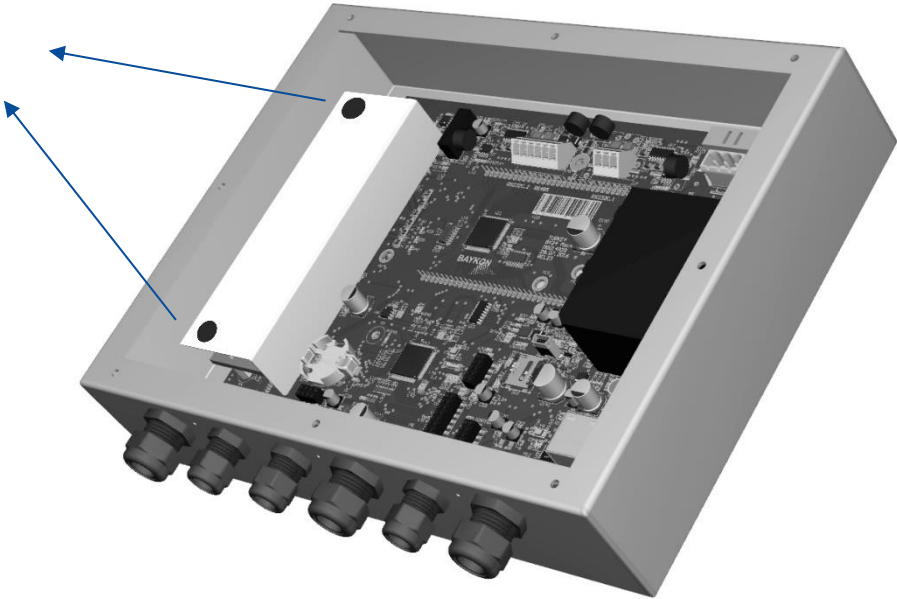
1. Check the Bit-0 of Calibration Status. It should be '1'(set) to start adjustment.
2. Write 'Adjust Zero Calibration' command and apply New CMD to start Zero calibration.
3. Check the Bit-1 of Calibration Status. It is '1'(set) during zero calibration process.
4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Zero calibration.
5. If the Bit-3~Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

#### Span Calibration procedure:

1. Check the Bit-0 of Calibration Status. It should be '1'(set) to start adjustment.
2. Write 'Adjust Span Calibration' command after writing test weight values to Low Dword of RxPDO 1 (R\_UL1), then apply this command with New CMD to start Span calibration.
3. Check the Bit-1 of Calibration Status. It is '1'(set) during span calibration process.
4. The Bit-0 of Calibration Status changes to '1'(set) at the end of the Span calibration.
5. If the Bit-3~Bit-10 of Calibration Status is '1'(set), check the description to understand the calibration error.

# 17 SEALING OF APPROVED SCALE




Sealing  
With sticker





# 18 TROUBLE SHOOTING

FT-112 weighing indicator has been designed as a very reliable and virtually error free instrument. However, if an error occurs, do not attempt to repair the equipment before understanding what caused the error. Note the problems you have with your instrument and the error messages shown on the display. Then try to solve the problem using the error table below.

ERROR CODE	DESCRIPTION	THINGS TO DO
	Weight is too low	<ul style="list-style-type: none"> <li>- Check the load</li> <li>- Load cell or instrument could be broken.</li> </ul>
	Over-Load	
LC Err	Load exceeds the operation range	<ul style="list-style-type: none"> <li>- Check the load</li> <li>- Check the calibration</li> <li>- Load cell or instrument could be broken.</li> </ul>
+POWERONZEROERR	Weight exceeds power on zero range. Cannot zero!	<ul style="list-style-type: none"> <li>- Press  key to start indication without zeroing and call service.</li> </ul>
-POWERONZEROERR		
DUE to TILT	Indicates a tilt position error.	<ul style="list-style-type: none"> <li>- Check if the platform is level.</li> <li>- Check parameter 51A.</li> </ul>
LOW VOLT PWR OFF	Power source voltage is less than 85 VAC for AC variant or 9 VDC for DC variant.	<ul style="list-style-type: none"> <li>- Check the power supply voltage.</li> </ul>
HIGH VOLT PWROFF	Voltage is more than 30 VDC for DC variant.	
E01 ADC ERROR	ADC initialization error. ADC could not initialize at power on. ADC or its interface circuitry has a malfunction.	<ul style="list-style-type: none"> <li>- Power off the instrument, re-energize it after 30 seconds.</li> <li>- Check external load cell connection.</li> <li>- Check load cell connector in the instrument.</li> <li>- Change main board or second scale board.</li> </ul>
E02 ADC ERROR	ADC conversion error. ADC could not convert the load cell signal. ADC or its load cell connection circuitry may have a malfunction.	
E03 ADC ERROR	ADC data is out of the range. ADC could not convert the load cell signal in range. ADC or its load cell connection circuitry may have a malfunction or load cell excitation voltage is too low.	
E10 NVM VERSION	NVM version error. Factory default will be loaded.	<ul style="list-style-type: none"> <li>- If you changed the E<sup>2</sup>ROM (U6) press enter key. The factory defaults will be loaded.</li> <li>- If not, change main board.</li> </ul>
E20 CALIBRATION	Checksum error of calibration coefficients.	<ul style="list-style-type: none"> <li>- Check the scale performance.</li> <li>- Recalibrate the scale.</li> <li>- Change mainboard.</li> </ul>
E21 SETUP ERROR	Check sum error of parameters.	<ul style="list-style-type: none"> <li>- Check the scale performance.</li> <li>- Recalibrate the scale.</li> <li>- Change mainboard.</li> </ul>
E22 CHECKSUM ERR	Checksum error of the data.	<ul style="list-style-type: none"> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E23 HEADER ERR	Header checksum error.	<ul style="list-style-type: none"> <li>- Press enter key and re-enter the headers.</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E24 FOOTNOTE ERR	Footnote checksum error.	<ul style="list-style-type: none"> <li>- Press enter key and re-enter the footers.</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>

E25 FBUS SETUP E	Fieldbus set up error.	<ul style="list-style-type: none"> <li>- Press enter key and re-enter the fieldbus setup.</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E26 SETPOINT ERR	Setpoint (limit values) checksum error.	<ul style="list-style-type: none"> <li>- Press enter key and re-enter the setpoint (limit) values.</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E28 CLOCK ERROR	Clock error.	<ul style="list-style-type: none"> <li>- Change CR2032 battery.</li> <li>- Change the main board.</li> </ul>
E29 ID NAME ERROR	ID header checksum error.	<ul style="list-style-type: none"> <li>- Change main board.</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E32 LABEL ERROR	Checksum error of EPL printout format.	<ul style="list-style-type: none"> <li>- Press enter key and re-load the EPL code</li> <li>- Change E<sup>2</sup>ROM (U6).</li> </ul>
E34 NOT LOADED	ADC output is not changed for the span calibration.	<ul style="list-style-type: none"> <li>- Recalibrate the scale.</li> <li>- Change mainboard.</li> </ul>
E35 LC CONNECTIO	The load cell output is decreased after loading.	<ul style="list-style-type: none"> <li>- Check load cell connections.</li> <li>- Check test weight loading.</li> </ul>
E36 ADD LOAD	The load is not enough for span calibration.	<ul style="list-style-type: none"> <li>- Recalibrate the scale.</li> <li>- Change mainboard.</li> </ul>
E37 UNSTABLE	The load is unstable during calibration.	<ul style="list-style-type: none"> <li>- Wait for scale to stabilise.</li> <li>- Check grounding wiring.</li> <li>- Recalibrate the scale.</li> <li>- Change mainboard.</li> </ul>
E40 NO ALIBI SD	Alibi memory SD card is not installed.	<ul style="list-style-type: none"> <li>- Disable Alibi memory if not required.</li> <li>- Check Alibi SD card.</li> <li>- Change mainboard.</li> </ul>
E41 ALIBI FAULT	Alibi SD card is not supplied from Flintec.	<ul style="list-style-type: none"> <li>- Install Flintec Alibi SD card.</li> </ul>
E42 NEW ALIBI	Alibi memory serial number error. A new alibi SD card is installed.	<ul style="list-style-type: none"> <li>- Please format the alibi memory SD card. Refer to parameter 815.</li> </ul>
E43 ALIBI ERROR	Alibi memory could not be initialized.	<ul style="list-style-type: none"> <li>- Check alibi memory SD card</li> <li>- Change main board.</li> </ul>
E44 ALIBI CSUM E	Alibi CSUM error.	<ul style="list-style-type: none"> <li>- Check alibi memory records.</li> </ul>
E47 ALIBI CSUM E	Alibi information CSUM error.	<ul style="list-style-type: none"> <li>- Change Alibi memory SD card.</li> <li>- Change main board.</li> </ul>
E48 ALIBI SD ERR	Wrong SD card at alibi memory.	<ul style="list-style-type: none"> <li>- Order correct Alibi SD card.</li> </ul>
E50 DLC CARD FAI	The DLC board is damaged or not installed.	<ul style="list-style-type: none"> <li>- Re-energize indicator.</li> <li>- Change the DLC Board.</li> </ul>
E61 FLASH ERROR	E2PROM Error.	<ul style="list-style-type: none"> <li>- Change main board.</li> </ul>
E70 MB SELECT ER	Modbus selection error	<ul style="list-style-type: none"> <li>- Check data format of other interfaces.</li> <li>- Other interfaces should not be Modbus.</li> </ul>
E71 TARING ERROR	Tare range error during filling	<ul style="list-style-type: none"> <li>- Check scale stability.</li> <li>- Check tare min and max values.</li> </ul>
E72 TARGET ERROR	Target value error during checkweighing.	<ul style="list-style-type: none"> <li>- Check Target value.</li> </ul>
E73 TOTAL ERROR	Totalization CSUM error.	<ul style="list-style-type: none"> <li>- Restart totalization after deleting the total.</li> <li>- Change E<sup>2</sup>PROM (U6).</li> <li>- Change main board.</li> </ul>
E74 TOTAL PRT ER	Totalization data cannot be recorded to the alibi memory.	<ul style="list-style-type: none"> <li>- Check alibi memory SD card.</li> <li>- Change main board.</li> </ul>

E76 QTY OVER 99	Up to 99 items can be totalized.	<ul style="list-style-type: none"> <li>- Press enter key to finalize totalization after printing.</li> <li>- Press MRC key to delete totalization.</li> </ul>
E78 NO PT RECORD	Preset tare memory error.	<ul style="list-style-type: none"> <li>- PT is not entered or PT checksum error.</li> <li>- Enter PT.</li> <li>- Call service</li> </ul>
E80 VERIFY SCALE	Re-verification the scale.	<ul style="list-style-type: none"> <li>- Re-verify the scale after checking the scale hardware, load cells, performance etc.</li> </ul>
E81 CANNOT ADDR	DLC could not addressed.	<ul style="list-style-type: none"> <li>- Check the DLC connection (RS-485 &amp; Power supply) hardware.</li> <li>- Check the DLC and S/N.</li> </ul>
E82 SHIFT ADJUST	Shift adjustment is not available due to load cell coefficients being out of limits.	<ul style="list-style-type: none"> <li>- Check addressing is done correctly.</li> <li>- Check test weight loading on the correct DLC.</li> <li>- Check the load cell installation and scale installation.</li> </ul>
E83 DLC COUNT ER	No regular response from load cell	<ul style="list-style-type: none"> <li>- Re-energize the indicator.</li> <li>- Check the DLC connection (RS-485 &amp; Power supply).</li> <li>- Change load cell.</li> </ul>
E84 SN NOT MATCH DLC yy <sup>(1)</sup>	The address and S/N of the load cell do not match.	<ul style="list-style-type: none"> <li>- Check the DLC and S/N.</li> <li>- Re-energize the indicator.</li> <li>- Re-address the DLC.</li> </ul>
E85 DLC TIMEOUT DLC yy <sup>(1)</sup>	Communication time out	<ul style="list-style-type: none"> <li>- Check the DLC connection (RS-485 &amp; Power supply) hardware.</li> <li>- Check the DLC and S/N.</li> </ul>
E86 DLC COM ERR DLC yy <sup>(1)</sup>	Status error of load cell	<ul style="list-style-type: none"> <li>- Change load cell.</li> </ul>
E87 DLC UNDER DLC yy <sup>(1)</sup>	The DLC is under	<ul style="list-style-type: none"> <li>- Check mechanical installation and DLC.</li> </ul>
E88 DLC OVER DLC yy <sup>(1)</sup>	The DLC is over	<ul style="list-style-type: none"> <li>- Check mechanical installation and DLC.</li> </ul>
E89 DLC CHKSUM DLC yy <sup>(1)</sup>	Checksum error	<ul style="list-style-type: none"> <li>- Check termination resistors.</li> <li>- Check the DLC connection (RS-485 &amp; Power supply) hardware.</li> </ul>
E90 DLC PWR ERR	Power supply of DLCs could not detected.	<ul style="list-style-type: none"> <li>- Check the power supply connection.</li> <li>- Change the LPK16.</li> </ul>
E91 DLC SYSTEM	Internal communication error between the DLC board and the indicator.	<ul style="list-style-type: none"> <li>- Change the DLC board.</li> <li>- Change the main board.</li> </ul>
E92 DLC UNMATCH	Capacity of the load cell is different.	<ul style="list-style-type: none"> <li>- Check capacity of the DLC</li> </ul>

1) yy = Number / Address of the digital load cell.



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