FT-111 Panel

Weighing Terminal

User Manual

Flintec
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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-111 Weighing indicator is economic and powerful state-of-the-art indicator for industrial weighing applications like basic weighing, labelling system control with digital outputs, fieldbus interfacing etc. It's set memory 500 item record size which each item has 5 pieces limit values gives big advantage in operation.

Digital inputs and outputs of the instrument can be programmed as a Remote IO on the fieldbus. This feature gives advantage to eliminate additional PLC in the cabinet for only having remote IO's.

The scales equipped with FT-111 weighing indicator can be used in all kind of industrial areas up harsh, to wet and hygienic environments with its fast and efficient cleaning that was designed and built according to the international guidelines.

2.2 Variants

These panel type indicators may have various industrial interfacings and digital Inputs/Outputs. A variant of FT-111 indicators specifies the peripheral interfacings of the instrument as shown below. All variants can connect to Modbus RTU and Modbus TCP instruments which requirements Modbus SD card.

Other features and specifications of all variants are the same. FT-111 names are used as family names in this manual. Variant names are written only to describe interfacing the instrument have.

	FT-111	FT-111 IO	FT-111 AN	FT-111 PB	FT-111 PN	FT-111 CO	FT-111 EI	FT-111 EC	FT-111 CC	FT-111 PL	FT-111 IE
Serial interface RS 232C	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial interface RS 485	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial interface RS 422	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digital 4 Input / 5 Output	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Analogue output	-	-	Yes	-	-	-	-	-	-	-	-
Profibus DPV1 interface	-	-	-	Yes	-	-	-	-	-	-	-
CANopen interface	-	-	-	-	-	Yes	-	-	-	-	-
CC-Link interface	-	-	-	-	-	-	-	-	Yes	-	-
Profinet interface	-	-	-	-	Yes	-	-	-	-	-	-
Ethernet interface	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EtherNet/IP interface	-	-	-	-	-	-	Yes	-	-	-	-
EtherCAT interface	-	-	-	-	-	-	-	Yes	-	-	-
Powerlink interface	-	-	-	-	-	-	-	-	-	Yes	-
CC-Link IE Field	-	-	-	-	-	-	-	-	-	-	Yes
Modbus RTU	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Modbus TCP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

2.3 Specifications

Analogue Load cell (only FT-111)	
A/D converter type	24-bit Delta-Sigma ratio metric with integral analog and digital filters
Conversion rate	Up to 1600 measurement values per second
Input sensitivity	0,4 µV/e approved; 0.05 µV/d non approved.
Analog input range	-5 mV to +19 mV
Internal resolution	up to 16 000 000
Excitation	5 VDC max. 150 mA
Number of load cells	Up to 8 load cells 350 Ω or 25 load cells 1100 Ω.
Connection	4- or 6-wire technique. Home run cable length: maximum 1000 m/mm² for 6-wire connection between FT-111 and junction box.
Scale	
Range	Single range, up to 3 x multi intervals, up to 3 x multi ranges.
Display resolution	Approval, up to 10 000 division at usage in trade, according to EN45501 and OIML R76. Up to 300 000 division at industrial usage.
Calibration and Functions	
Calibration	Calibration with test weights, eCal electronic calibration without test weights, Temporary zero calibration, Zero adjustment, Gain adjustment, Coefficient entry.
Digital filter	5 steps programmable adaptive filter
Dynamic filter	Programmable dynamic filter
Weighing functions	Taring, zeroing, auto zero tracking, motion detection, auto zero at power up, tare status save at power off, increased resolution, automatic tare and clear, temporary gross indication, unit change.
Standard applications	Labelling with barcode, livestock weighing and free setpoints, basic peak, hold, functional outputs, Remote IO of PLC or HMI, fieldbus interface.

Memory		
Application memories		Set Memory to save limit values at your industrial weighing. Memory size is 500 item records
Alibi memory (optional)		99 999 records
Communication		
Connectable with		PC, PLC, Printer, Remote display, EPL printer etc.
RS 232	Isolation	Galvanically isolated.
	Baud rate	1200 to 57600 programmable
	Data	Length 7 or 8 bits; parity even, odd or none
RS 485	Isolation	Galvanically isolated.
	Baud rate	1200 to 57600 programmable
	Data	Length 7 or 8 bits; parity even, odd or none
	Stations	Up to 31 stations
RS 422	Baud rate	1200 to 57600 programmable
	Data	Length 7 or 8 bits; parity even, odd or none
	Stations	Up to10 stations
Ethernet TCP/IP	Transmission rate	10 / 100 Mbit/s, Full duplex
	TCP/IP settings	Manual IP assign over Indface2x PC Software or by keys in programming mode
	Connection method	Server or Client
	Installation	Switched Ethernet transmission with shielded twisted pair cables and RJ-45.
	Isolation	Galvanically isolated bus electronics
	Response speed	Up to 4 ms response delay after read/write commands
USB	Connection	Standard USB Micro-B cable
	Response speed	Min. 4 ms response delay after read/write commands
Digital Inputs and Outputs (opional)		
Digital Inputs		Optoisolated 4 digital input, 12 to 28 VDC, 10mA. Any input(s) can be used as a Remote input of your PLC over BSI or Modbus.
Digital Outputs		5 free relay contact, 250 VAC or 30 VDC, 0.2A Any output(s) can be used as a Remote output of your PLC over BSI or Modbus.
Analogue Output (opional)		
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 Ω
Minimum load resistance (voltage output)		10 kΩ

Profibus DPV1 (opional)	
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
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
Profinet (opional)	
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
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
CANopen (opional)	
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 meter.
Installation	2 wire shielded twisted pair cable Alternatively 4 wire with 24 Volt power 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

Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
EtherNet/IP (opional)	
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.
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
EtherCAT (opional)	
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.
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
CC-Link (opional)	
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
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.

Powerlink (opional)	
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
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
CC-Link IE Field (opional)	
Data rate	1 Gbit/s Baud Rate
CSP+ file	Generic CSP+ file provided
Topology	Line, Star, Line/Star mixture or Ring topology depending on physical media
Installation	IEEE802.3 1000Base-T cable, ANSI/TIA/EIA-568-B (Category 5e) compliant 4-pair balanced-type shield cable, Double-shield type is recommended.
Max. number of networks	Up to 239
Number of connected nodes per network	Master station=1, Slave station= 120
Isolation	Galvanically isolated bus electronics
Response speed	Up to 4 ms. response delay after read/write commands.
Remote IO	Digital inputs and outputs of the instrument can be programmed independently as a Remote IO's of PLC to control them over fieldbus.
Power Consumption	
	FT-111 12 – 28 VDC 250 mA + max. 500 mA for fieldbus interfacing **FT-111 D** 12 – 28 VDC 150 mA + max. 500 mA for fieldbus interfacing + load cell currents.
Environment and Enclosure:	
Operation temp. range	Approved scales -10 °C to +40 °C Industrial usage -15 °C to +55 °C
Humidity	80% RH max, non-condensing
Enclosure	Stainless steel front panel and rear panel, aluminum body.
Protection	Front panel IP67
Panel cut size	186 x 92 mm (7.32 x 3.62")

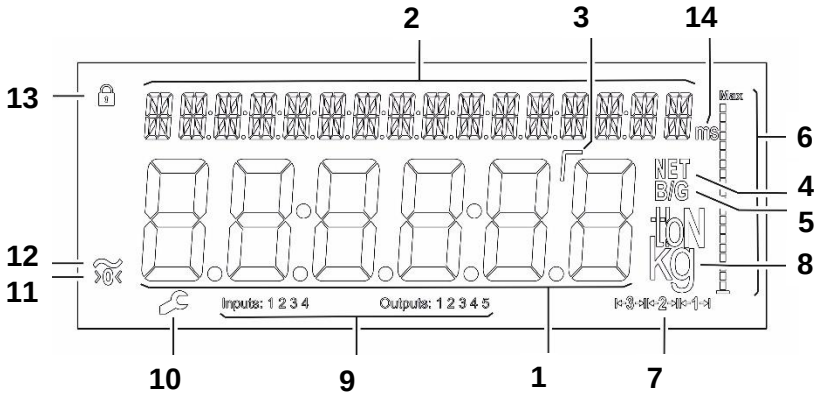
Sizes (W x H x D)	205 x 108 x 112,5mm	(8.07 x 4.25 x 4.43″)
Weight	1,4 kg	(3,07 lb)
Packing sizes (W x H x D)	273 x 190 x 153 mm	(10,75 x 7,48 x 6,02″)
Weight Packed	2,5 kg	(5,51 lb)

2.4 The Front View and Key Functions

Figure 2.1 – Front view of FT-111

2.4.1 Display

The bright and wide angle LCD display of the FT-111 instruments is shown below.



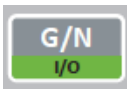
The meanings of the announcement symbols on the display are:

1	8	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	NET	Announces the indicated value is the net weight.
5	B/G	Announces the indicated value is the gross weight.
6	Max	Bar graph
7	I-3-II-2-II-1-I	Indicates the range of the scale at multi range and multi interval operations.
8	kg	g, kg, t, lb, klb, N, kN units are located on the right of the display.
9	Inputs: Outputs:	Announces the activated inputs and outputs.
10		Announces the instrument is at repair status or call service.
11	>0<	Announces the weight value is in the center of zero range.
12		Announces the weighing is not stable. After stabilization of the weighing, this symbol disappears.
13		Announces the keys are locked.
14	ms	Announces the time unit of the parameter value is millisecond or second.

2.5 Key Pad

The keys and the key functions of FT-111 in usage are:

	**Programmable Function key** "F1"* This programmable key is set for your easy usage in your application. **Escape** Press this key to exit from any entry or from any block at programming.	*Page 54, 34,*
	**Temporary gross weight indication** Press the key to read the gross weight temporary until pressing the key. The display returns to the normal operation automatically after 10 seconds at approved scales.	
	**High resolution** Press the key to read the weight at high resolution. Press the second time to return normal operation. The high resolution weight displaying is ended automatically in 10 seconds at approved scales.	*Page 34, 58*
	**Set point entries** Press this key to enter set points.	*Page 81,*
	**Memory** This key is used to access the memory or to save the item data in to the memory.	*Page 81*
	**Navigation keys** These keys are used to navigate in the memories, entries and programming. The meanings of the navigation keys are; Previous parameter. Next digit or parameter. Increase or next block. Decrease or previous block. Enter into the parameter to enter data. Save the data after entry. Go to the next parameter.	*Page 95*
	**Print** By pressing this key the weight data is transferred to a printer or to a PC at weighing.	*Page 95, 87*
	**Tare** Press this key for taring the scale.	*Page 32, 33, 53*
	**Clear** Clears the tare and indication returns to the gross value.	*Page 33*
	**Zeroing** If the unloaded scale doesn't show zero at gross operation, press this key to compensate zero drift.	*Page 32, 58*

2.6 Passwords

RELATED PARAMETERS: Sub-block 26- .

2.6.1 Key lock

FT-111 has capability to lock the keys to avoid unauthorized interfere. The key(s) which would be locked are programmed in the setup at sub-block 34- . Key lock password default is 11.

Lock the keys:

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

Unlock the keys:

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

2.6.2 Passwords

User password
This password is used to setup the interface, usage configuration and application related parameters for your application.

To enter the programing.

Display	Operation
[123.456 kg]	Press key until [**PASSWORD :**] prompts seen.
[PASSWORD]	+ + keys sequentially for user entry.
[***]	Press key.
[1—INTERFACE]	You entered to the programming main menu and the first main block [1—INTERFACE] prompt appears.

Service password
This password is used to interfere the instrument parameters and calibration only by trained technical persons. Refer to section 5.1 on **page 39**.

3 INSTALLATION

PRECAUTION: 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.

3.1 Recommendations

3.1.1 Environment

The weighing indicator should be placed in an area which is clean, not getting direct sun light if possible, having a temperature between -15 ºC and +55 ºC and humidity not exceeding 80% non-condensing. All external cables should be installed safely to avoid mechanical damages.

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

3.1.2 Cabling

- All cables coming to the instrument shall be high quality and shielded.
- Distance from load cell cables, interface cables and DC power supply cables to power line cables shall be minimum 30 cm. The separate cable tray usage for these low signal level cables is strongly recommended.
- Shields of all cables should be connected to the grounding screws under terminals as shown at the picture below.

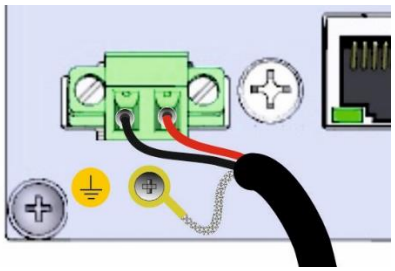


Figure 3.1– The shield connection to the protective earth.

3.1.3 Electrical Connection

- Always remember that FT-111 terminal is very low voltage measuring instrument used in the industrial environment. Your proper installation increases reliability and performance of the instrument.
- Only the trained person should interface the instrument against malfunction at installation.
- If the energy condition of your plant is not good enough, prepare a special power line for DC power supply in the cabinet.
- The quality of your plant grounding will provide weighing accuracy and the safety of FT-111. If grounding of your plant is not good enough, prepare a special grounding.
- Power off the instrument before connecting or disconnecting any peripheral instrument.
- The shielded cable usage and ground connection of the cables' shields will increase the immunity of FT-111 against electrical disturbances.
- All required electrical connections should be done as described in the installation section.
- If you have to service the terminal, turn the power off and wait at least 30 seconds before opening housing.

3.1.4 Location of the Peripheral Connections

The electrical terminals are located on the rear of the instrument as shown in the picture below.

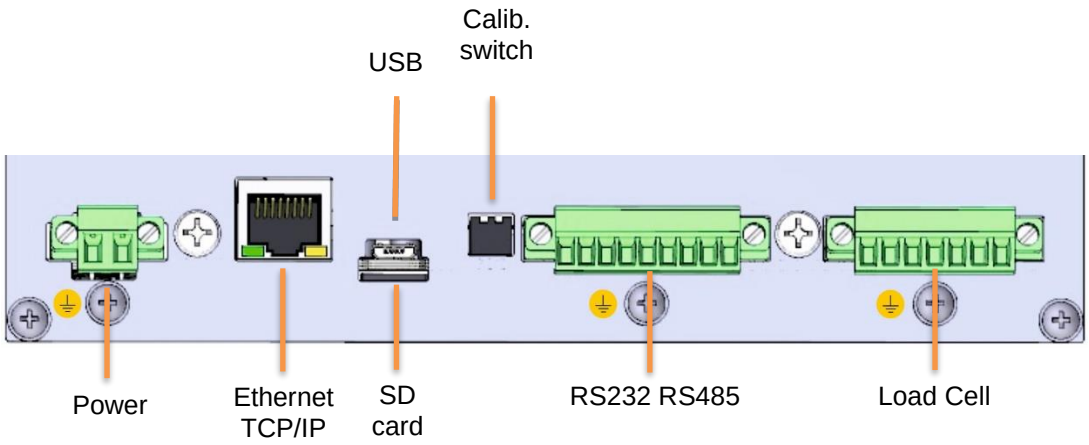


Figure 3.2 – The rear view of the instrument and terminal names.

3.2 Cleaning

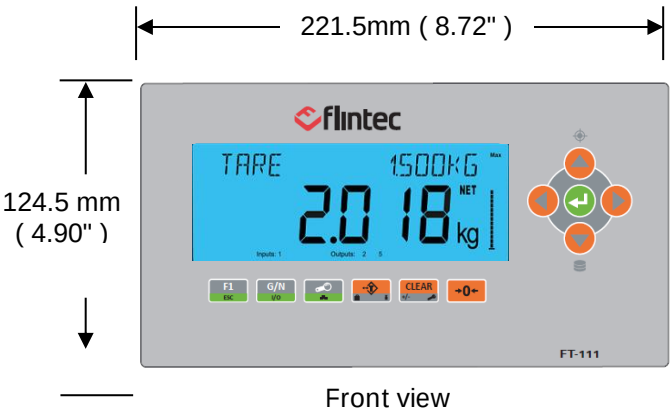
Warning: *Disconnect the instrument from power source before start cleaning for your safety.*

FT-111 Panel weighing indicator is designed for using in wet, hygienic and harsh environment. To maintain the instrument, never use harsh abrasive cleaners or solvents. Wipe the instrument with a soft cloth slightly dampened with warm soapy water or with mild detergent.

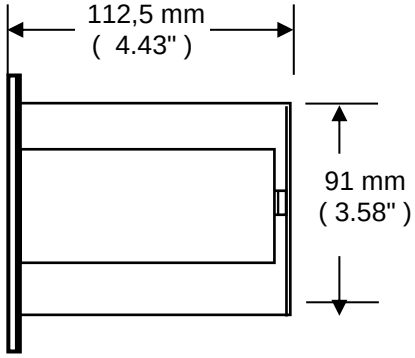
3.3 Disposal

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 the collecting point specified for electrical and electronic equipment. For your questions, please contact the responsible local authority. Thank you for your attention to environmental protection.

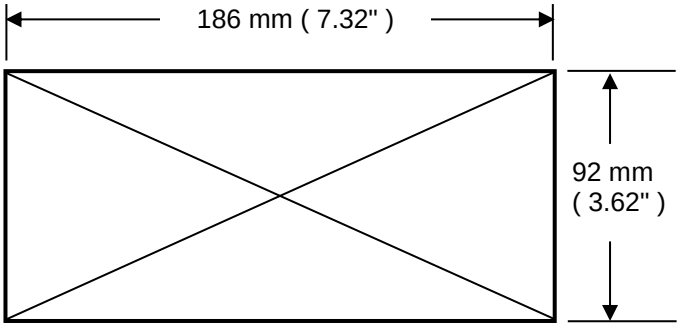
3.4 Housing



Front view

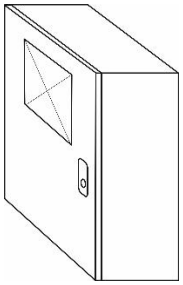


Side view

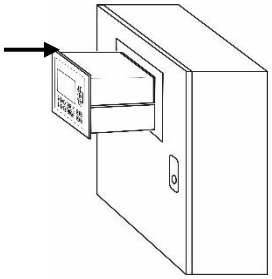


Panel cut sizes

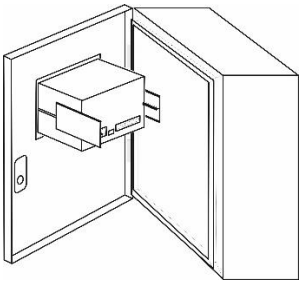
3.5 Mechanical Installation



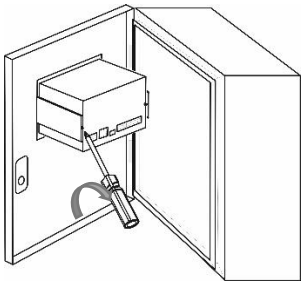
Cut the panel of the cabinet to install the instrument..



Insert the instrument to the cut on the panel after placing the waterproof sealing rubber behind the panel of FT-111.



Place holder parts of the instrument to the both side of the instrument.



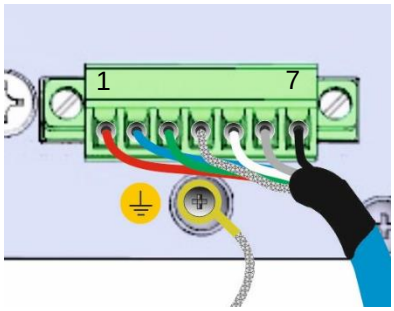
Use 2 pcs M4 screws to mount the instrument to the panel after alignment.

3.6 Electrical Connections

3.6.1 Analogue Load Cell Connection

To avoid damages, the load cell wiring should be made carefully before energizing the instrument. Load cell connection schematics are in
Figure 3.3.

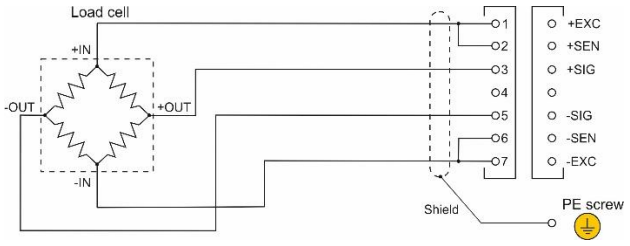
The same polarity sense and excitation pins of the load cell connector **should be short circuited** for 4-wire installation. If you have junction box in your system, use 6 wire cable between indicator and the junction box, and short circuit these pins in junction box for better performance as shown below.



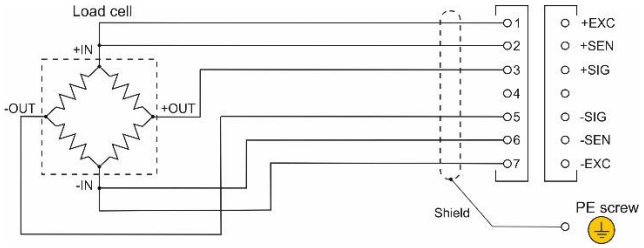
Pin number	Definition	Description
1	+Exc	+ Excitation
2	+Sen	+ Sense
3	+Sig	+ Signal
4	Shield	Protective Earth
5	-Sig	- Signal
6	-Sen	- Sense
7	-Exc	- Excitation
⏚	Shield	Protective Earth

Table 3-1 – Pin configuration of the analogue load cell terminal.

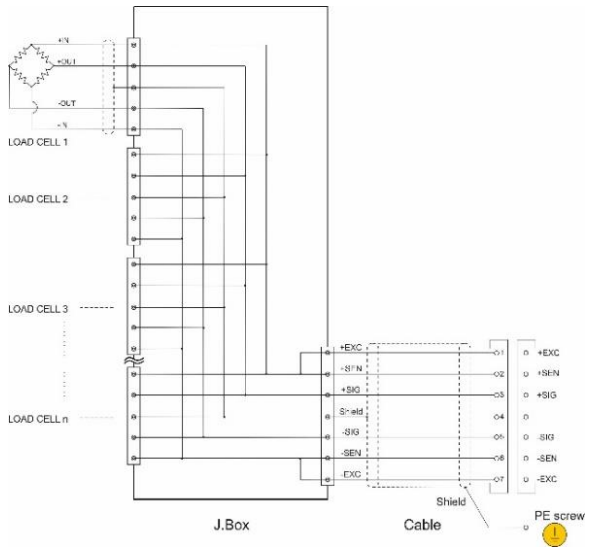
Protective ground connection of cable shields is done by;



4 wire load cell connection



6 wire load cell connection



Junction box connection.
Wiring between instrument and junction box will be 6 wire.

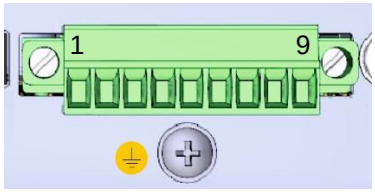
Figure 3.3 – The analogue load cell and junction box connection.

3.6.2 RS232C Serial Port

FT-111 weighing indicator has RS232C serial port which is galvanically isolated from other circuitry to increase the EMC immunity. The usage of this serial port and its specifications are described in the Table 3-2 and its pin configuration is shown in Table 3-3.

Usage	Interfacing with printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol 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 3-2 - RS 232C Serial Interface Specifications



Definition	RS232C Pin number
TXD	1
RXD	2
GND	3
⏚	Under the terminal

Table 3-3 – Pin configuration of RS232C terminals

2 wire connection to peripherals: RS 232C serial connection is done with two wires as indicated below in Figure 3.4. if there is no data entry to the weighing indicator. Printer, remote display etc. connections can be done with 2 wire.

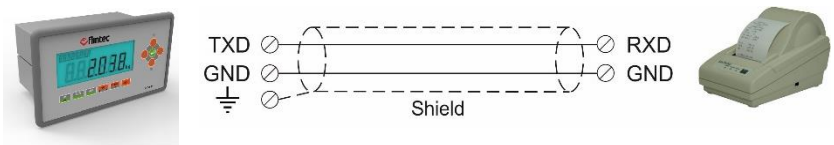


Figure 3.4 – 2 wire RS 232C connection with a printer or PC

3 wire connection to the peripherals: RS232C serial connection is done with three wires as indicated below in Figure 3.5 for bidirectional interfacing. Typical application is bidirectional BSI format interfacing with PC or PLC.

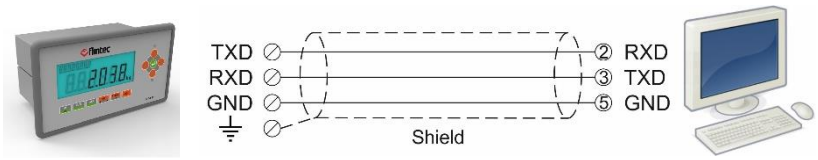


Figure 3.5 – 3 wire RS232C connection with a PC or PLC

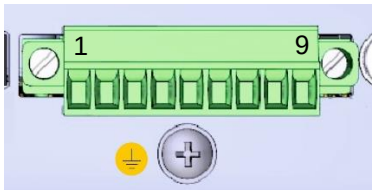
3.6.3 RS485 Serial Port

The usage of this galvanically isolated serial port and its specifications are described in the Table 3-4 and its pin configuration is shown in Table 3-5. Refer to **page 43** to configure RS485 serial port and **page 83** for details on data formats.

Remember 120-ohm line termination resistors should be installed both ends of the RS485 line.

Usage	Interfacing with Printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol 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 3-4 - RS485 Serial Interface Specifications



Definition	RS485 Pin number
A+	4
B-	5
⏚	Under the terminal

Table 3-5 – Pin configuration of RS485 terminal

RS485 serial connection is done with two wires as indicated below in Figure 3.6.

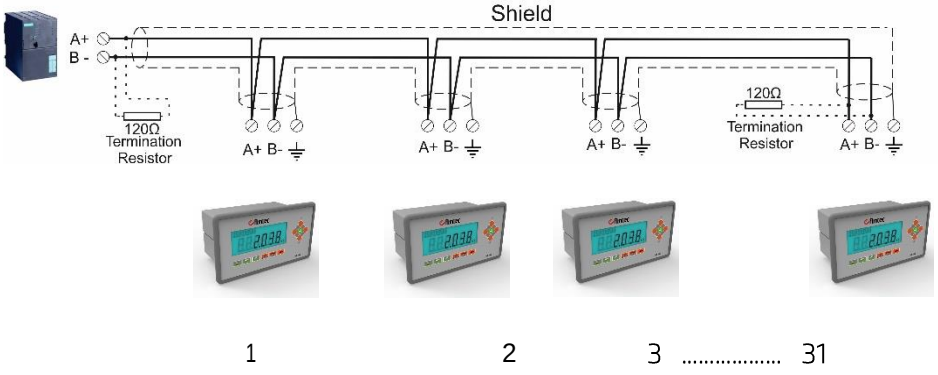


Figure 3.6 – Multi instrument connection with PLC

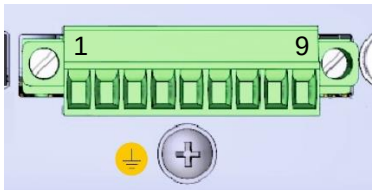
3.6.4 RS422 Serial Port

The usage of this full duplex serial port and specifications are shown in the Table 3-6 and its pin configuration is shown in Table 3-7. Refer to **page 44** to configure the serial port and **page 83** for details on data formats.

Remember 120-ohm line termination resistors should be installed both ends of the RS422 line.

Usage	Interfacing with Printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol 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 10 instruments on the line.
Cable length	Maximum 1000m.

Table 3-6 – RS422 Serial Interface Specifications



Definition	RS422 Pin No.
RX+	6
RX-	7
TX+	8
TX-	9
⏚	Under the terminal

Table 3-7 – Pin configuration of RS422 terminal

RS422 serial connection is done with four wires as shown in Figure 3.6.

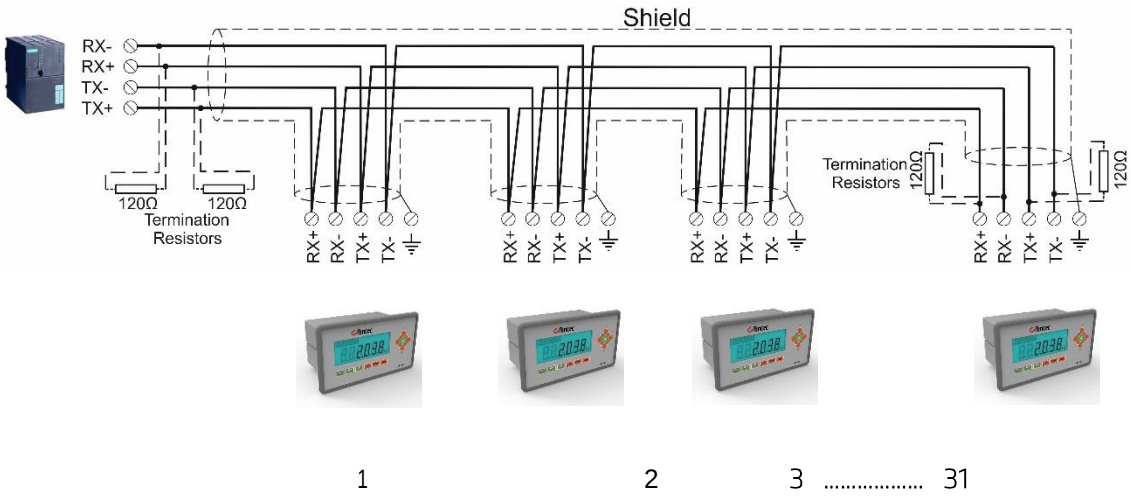


Figure 3.7 – RS422 multi instrument connection with PLC

You may use RS422 port as a second RS485 port after adding 2 short circuits between the terminal pins as shown below.

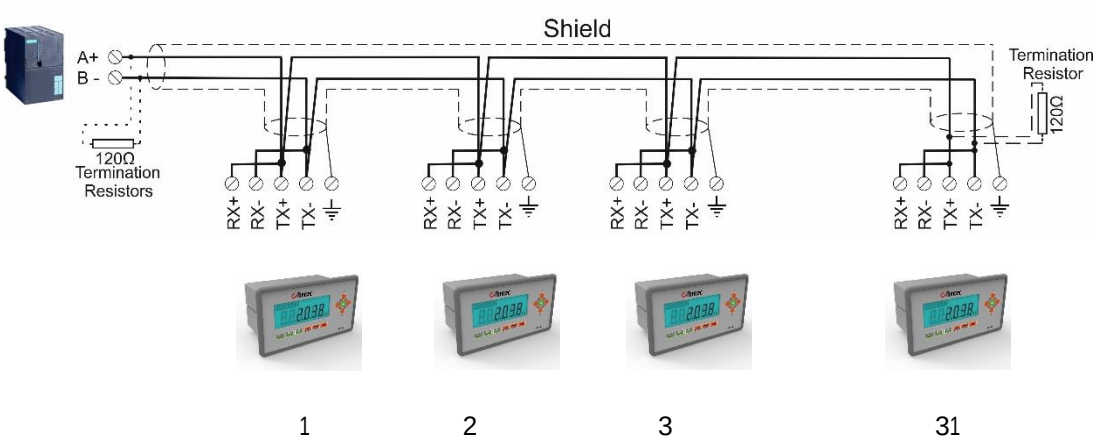


Figure 3.8 – The second RS485 port usage of RS422 port (half duplex).

3.6.5 Ethernet TCP/IP

The usage of the Ethernet port on the main PCB and its data formats are shown in the Table 3-8 and its pin configuration is shown in Table 3-9. Refer to Section 0 of the manual to configure this interface. Use the RJ45 connecter with metal body and connect shield of the Ethernet cable to the metal body of the connector.

Usage	Interfacing with Printer, PC, PLC, remote display etc.
Data formats	Continuous, Fast Continuous, Printer, BSI Protocol or Modbus TCP

Table 3-8 – Data formats of Ethernet port

Pin no	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
Body	Shield		Metal body of the RJ45 connector.

Table 3-9 – Pin configuration of RJ45 Ethernet connector

The HUB connection cabling is a direct connection as shown below:

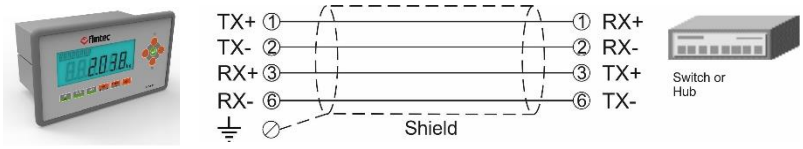


Figure 3.9 - HUB connection

The PC connection cabling is done via cross cable as shown below. IP address blocks and gateway address of FT-111 and PC should be the same in cross connection.

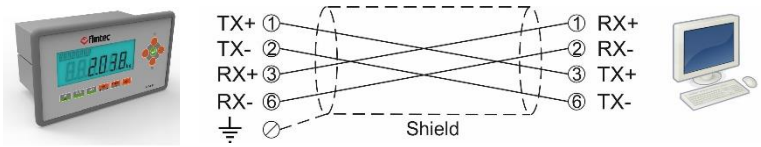


Figure 3.10 - PC connection with cross cable

Important note: *Disconnect Indface2x set up PC software before Ethernet interfacing.*

3.6.6 Profibus DP

Figure 3.11 - PLC Connection

PROFIBUS Connector pin configuration (DB9F)

Pin	Signal	Description
1	-	-
2	-	-
3	B Line	Positive RxD / TxD, 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 RxD / TxD, RS-485 level
9	-	-
Housing	Cable Shield	Ground

3.6.7 Profinet

Figure 3.12 - PLC Connection

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:

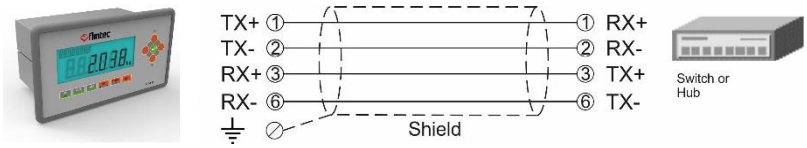


Figure 3.13 - HUB connection

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

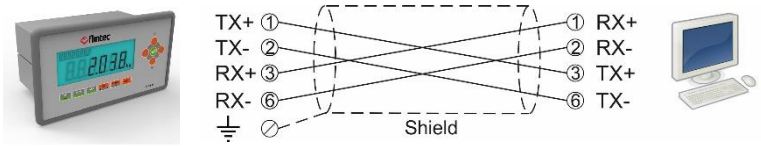


Figure 3.14 - Cross PC connection

3.6.8 CANopen

CANopen connection is done with four wire as indicated below in Figure 3.15. The data line ends must be terminated with 120-ohm resistors.

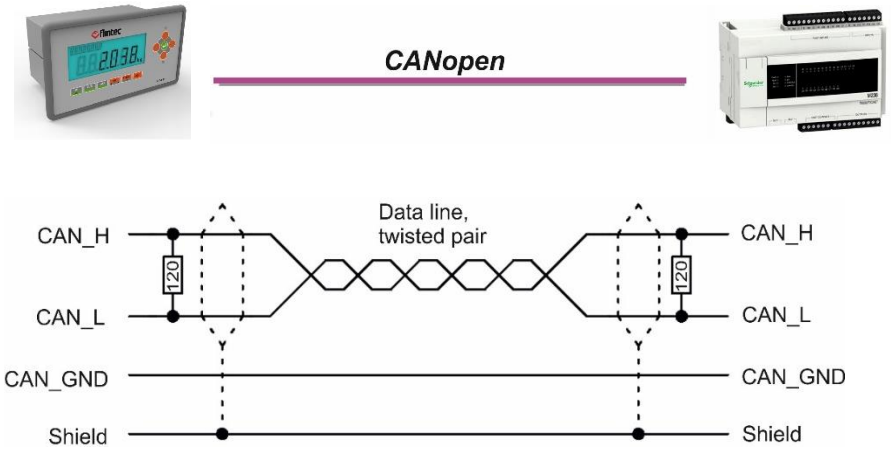


Figure 3.15 - PLC Connection

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	-

3.6.9 EtherNET/IP

Figure 3.16 – PLC Connection

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:

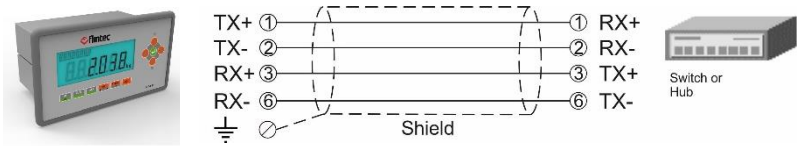


Figure 3.17 - HUB connection

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

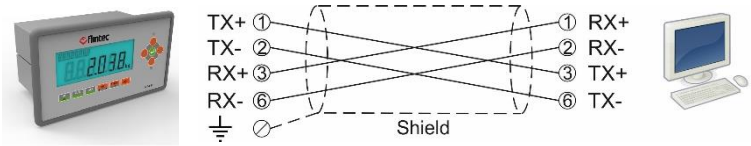


Figure 3.18 - Cross PC connection

3.6.10 EtherCAT

Figure 3.19 – PLC Connection

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:

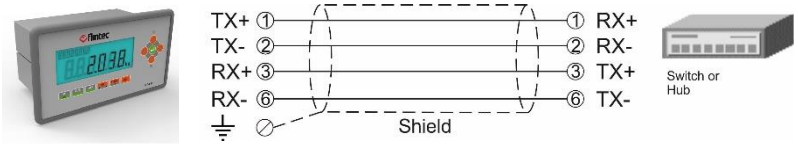


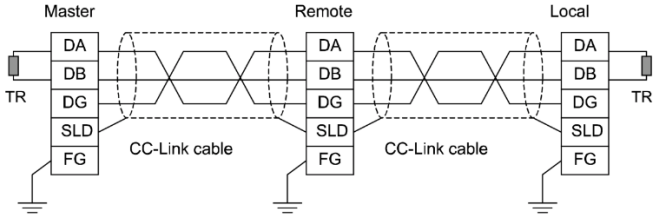
Figure 3.20 - HUB connection

3.6.11 CC-Link

Figure 3.21 - PLC Connection

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



3.6.12 Powerlink

Figure 3.22 - 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:

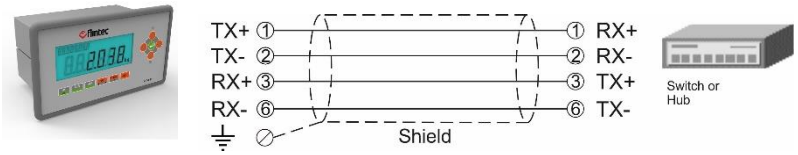


Figure 3.23 - HUB connection

3.6.13 CC-Link IE

Figure 3.24 - PLC Connection

CC-Link IE Field Connector pin configuration

Pin	Signal	Description
1	TP1+	Transmit/Receive 1 positive
2	TP1-	Transmit/Receive 1 negative
3	TP2+	Transmit/Receive 2 positive
6	TP3+	Transmit/Receive 3 positive
4	TP3-	Transmit/Receive 3 negative
5	TP2-	Transmit/Receive 2 negative
7	TP4+	Transmit/Receive 4 positive
8	TP4-	Transmit/Receive 4 negative
Housing	Shield	Connected to FE through a 1nF capacitor and a 1 Mohm resistor. Note that the connector shields are separated to prevent ground currents.

3.6.14 USB Port

The micro USB connector is located on the rear of the instrument. The usage of the USB 2.0 and its specifications are shown in the Table 3-10. Refer to **page 45** for USB port configuration.

Usage	Interfacing with PC via USB 2.0
Data formats	Continuous, Fast Continuous, BSI Protocol to PC near the instrument

Table 3-10 – Data formats of the USB port

3.6.15 Installation of Alibi SD card

Alibi memory requires the Alibi SD card at the SD1 card slot on the bottom of the main board as shown in the pictures below. If you install the alibi memory SD card, order Alibi SD pack from Flintec or dealer.

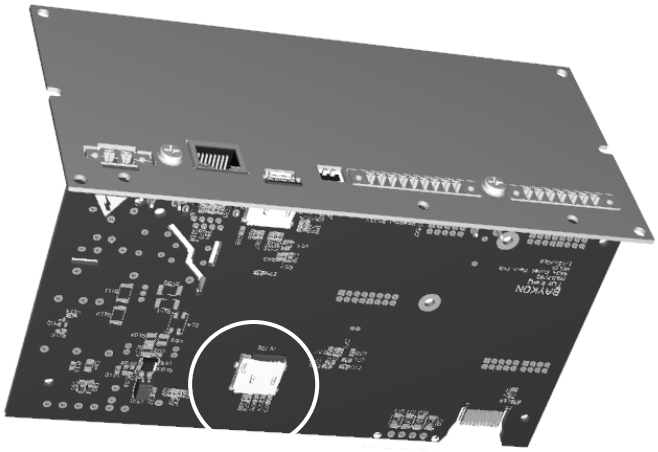
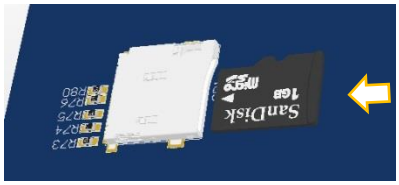


Figure 3.25- Location of Alibi SD card slot

Inserting or removing the Alibi SD card

1. Deenergize the instrument and wait 30 seconds before interfering the instrument.
2. Remove 4 pcs M4 screws at corners of the backplane.
3. Draw out the back plane and mainboard from the body of the enclosure. The location of the alibi card is on the rear side of the main board which is named as SD2.
4. Insert the Alibi SD card into the slot until it locks into place. Or remove the SD card by pressing it gently. Do not use screw driver to install or remove SD card.



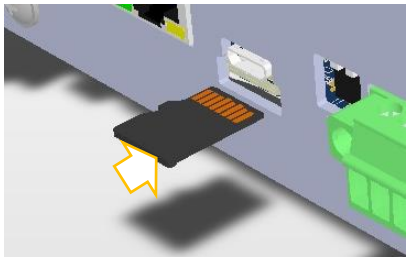
5. Place the sealing sticker as indicated at the sealing section.
6. Place the main card in to the instrument and mount the backplane to the body.
7. Energize the instrument.

3.6.16 Installation of SD Card

Some features of FT-111 requires SD card which slot is located on the rear of the instrument like Modbus RTU / TCP. These SD cards should be ordered for your use.

Insert the SD card

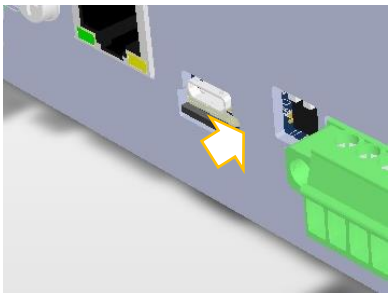
1. Deenergize the instrument and wait 30 seconds.
2. Insert the SD card into the slot until it locks into place.



3. Energize the instrument. FT-111 read the SD card at power on to initiate its function.

Remove the SD card

1. Deenergize the instrument.
2. Gently press on the SD card to release the lock, then carefully pull the card out.



3. Insert the new SD card as described above if needed.
4. Energize the instrument 30 seconds later power off.

3.6.17 Digital Inputs:

FT-111 digital inputs are programmable for zeroing, taring, clear, print, key lock, dynamic weighing start/reset, basic peak, hold and as a fieldbus Remote input at basic weighing.

Inputs connection diagram is shown in Figure 3.26.

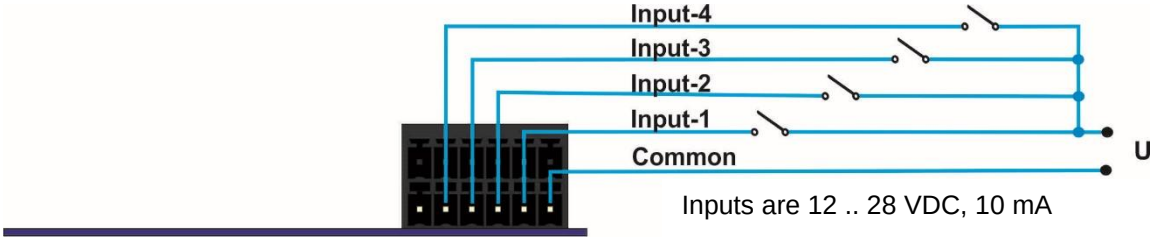


Figure 3.26 - Connection diagram of digital inputs

3.6.18 Digital Outputs:

FT-111 instrument digital outputs can be programmable as a free setpoint, as a control output or as a remote output at basic weighing.

Outputs connection diagram is shown in Figure 3.27.

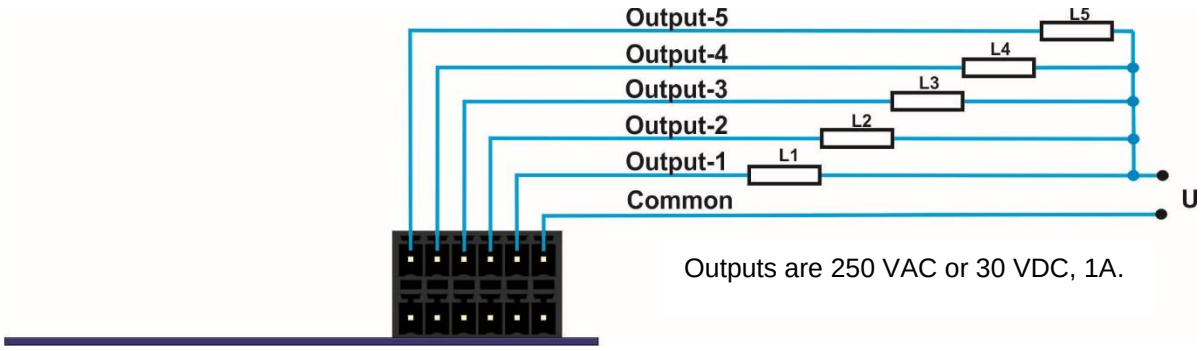


Figure 3.27 - Outputs connection diagram

3.6.19 Analogue Connection

Analogue connections are done as indicated below in Figure 3.28 and Figure 3.29.

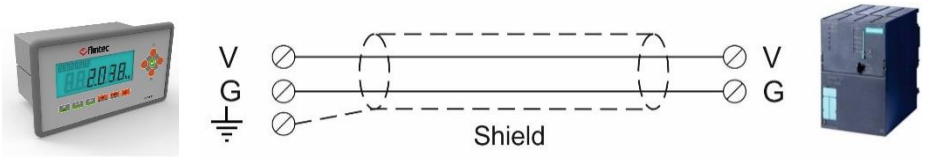


Figure 3.28 - Voltage output connections

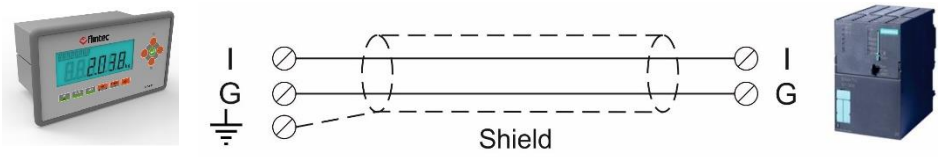


Figure 3.29 - Current output connections

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3.6.20 Power Source Connection and Grounding

Connect DC power supply of FT-111 to a noise proof power line due to the very low measuring signal level. The quality of the power line and DC power supply will determine the accuracy and the safety of your measuring system. 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 its voltage and be sure that it is the same with the voltage written on the weighing indicator.

Pin number	DC Power Supply
1	0
2	+24 VDC
PE Protective Earth (Grounding)	PE cable to the screw under the power supply terminal

Table 3-11 – Pin configuration of power supply connector.

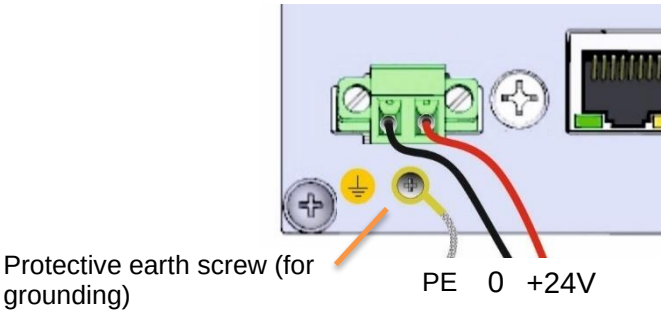


Figure 3.30 – Power source connection and grounding.

4 FT-111 FUNCTIONS

4.1 Basic Functions

Zeroing

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

1. Unload the scale.
2. Press →0← key.
3. Centre of zero appears >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 →0← key once more for correct zeroing.

Zeroing is available in the limited range by zeroing parameter 514, **page 58**.

Automatic zero point correction

Zero point is 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 58**.
Automatic zero-point correction range is limited together with zeroing range above.

Automatic zeroing at power on

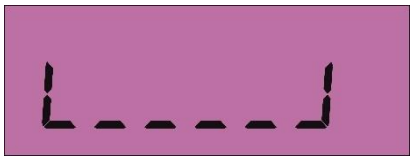
Zero point is corrected automatically at power on the instrument to compensate zero drifts of the scale if the scale is always power on when unloaded. This feature should be disabled for tank, silo, hopper scales etc. Power on zero has a limited range and the instrument announces [POWER ON ZERO ERR] error prompt in case of out of range.

Press F1 ESC key to start indication without zeroing and call service. If the range is 3%, the residual drift cannot be displayed. Refer to Power on Zero parameter 513, **page 58**.

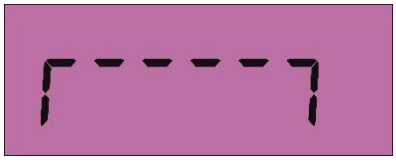
Basic weighing

1. Zeroing the unloaded scale.
2. Place weighing item on the scale.
3. Wait until the motion monitor disappears.
4. Read the weighing result.

If the loading is out of the indication range the prompts below are displayed.



Under of negative indication limit



Over than positive indication limit

Taring

Taring is used to determine a net weight of a material if any tools like containers are needed. The weight of these tools can be eliminated. FT-112 Panel weighing indicator has 2 different taring features.

Subtractive tare

This taring type is the mostly used way which tare value reduce the weighing range in Net as
Maximum Net weight = Scale capacity - Tare weight

Advantages of this taring are smaller capacity load cell requirement, bigger load cell signal range at weighing, temporary gross indication availability, tare weight data on the printout etc.

Additive tare
This taring type is the mostly used way if the tare weight is too heavy against the material weight and the scale division which is required. The scale range is not changed after taring. The net weight range is always equal to the scale capacity. The maximum tare is limited and is not transferred to PC or to the printer.

Net weighing in a container

Taring is used to weight material in a container.

1. Place an empty container onto the scale and press  key.
2. The zero display and the NET symbol appear.
3. Check >0< sign on the display. If it doesn´t appear, press the  key once more for correct taring.
4. Add the material into the container and follow its weight in net.

Clearing the tare

Press  key to clear the tare. The NET symbol disappears and Gross symbol appears on the display together with the gross weight indication. The scale instability will not impact clear the tare.

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 at **page 53**. The weight should be heavier than the value entered to the parameter 518 for automatic taring.

Automatic clear the tare

The tare is automatically cleared after emptying the scale, if this feature is enabled. The scale instability will not impact clear the tare automatically.

Restore status at power on

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.

Printing

Press  key when the item is on the pan and weight is stable to print the label. The printout format can be selected from parameter 161. Flintec PC software is used to program EPL printout data and download in to the instrument for free programming the data output or for label printing including barcode. Refer to **page 47**, and **88** for details.

4.2 Advanced Functions

Programmable key

 key can be programmed to fit the instrument into your application and for an easy use. The programmable functions are unit change, dynamic start/reset, basic peak, hold etc. Refer to sub-block 24-, **page 54** to see the availabilities.

High resolution

If you press  key, the weight value is displayed with a 10 times higher resolution until pressing the same key again. High resolution is displayed temporarily for 5 seconds at approved scales. High resolution cannot be printed.

Unit change

If you program the  key, the weight unit changes from first to second unit or revers. The unit change is available between kg and lb. Refer to parameters 521.

Dynamic weighing

APPLICATION: Living stock weighing, weighing of unstable load, unstable industrial weighing systems.

*RELATED PARAMETERS: Sub-block 33-, **page 54**.*

The dynamic weighing can be programmed for single weighing or continuous weighing after assigning the programmable key for dynamic weighing. Single weighing is used for dynamic weighing of parts like living animals; continuous dynamic weighing can be used for loads which have very high vibration like reactors having high speed mixers, 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 is started 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.

Depending 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 54**).

Net sign correction

Some weighings of materials are done by unloading the material from the container. The net sign correction enables always positive net weighing at loading and at unloading the material from scale by switching gross and tare weights, if necessary. Refer to parameter 237 to enable net sign correction.
Enabled net sign correction affects the display and printed data.

Displaying and printout	Net sign correction disabled	Net sign correction enabled
Tare	120.0 kg	30.0 kg
Gross	30.0 kg	120.0 kg
Net	- 90.0 kg	90.0 kg

Date and Time

RELATED PARAMETERS: Parameters 251, 252 and 253.

Date format of the country

1. Enter the programming and go to parameter 251, **page 54**.
2. Press ▲ or ▼ keys to select date format: DMY (DD.MM.YYYY), MDY (MM.DD.YYYYY) or YMD (YYYY.MM.DD) and press ↵ key to confirm.
3. Press F1 ESC key until [SAVE : YES] prompt seen.
4. Press ↵ key to save or press ▲ or ▼ keys to select "NO" to return operation without saving.

Date adjust

1. Enter the programming and go to parameter 252, **page 54**.
2. Press numerical keys to enter the date and press ↵ key to confirm.
3. Press F1 ESC key until [SAVE : YES] prompt seen.
4. Press ↵ key to save or press ▲ or ▼ keys to select "NO" to return operation without saving.

Time adjust

1. Enter the programming and go to parameter 253, **page 54**.
2. Press numerical keys to enter the time and press ↵ key to confirm.
3. Press F1 ESC key until [SAVE : YES] prompt seen.
4. Press ↵ key to save or press ▲ or ▼ keys to select "NO" to return operation without saving.

Tilt switch

Tilt switch is used to prevent wrong weighing in case of over tilting of platform.
Connect tilt switch to the Input 4 of the instrument and enable tilt switch by setting the parameter 51A.
[DUE TO TILTING] [------] prompt is displayed in case of over tilting.

User Language

RELATED PARAMETERS: Parameter 236.

You can select the operation and printout language of the instrument. The available languages are English, German, French, Italian, Spanish and Turkish. The language of programming is English which has the parameter code in front of parameter name for easy usage.

Language selection

1. Enter the programming and go to parameter 236, **page 53**.
2. Press ▲ or ▼ keys to select language and press ↵ key to confirm.
3. Press F1 ESC key until [SAVE : YES] prompt seen.
4. Press ↵ key to save or press ▲ or ▼ keys to select "NO" to return operation without saving.

Bar graph to display the capacity usage

The Bar graph, which is located on the right side of the display, is used for the graphical visualization of the measured value. It changes according to the Gross weight even the scale is displaying in Net. The usage of the scale capacity and the available range are seen on the bar graph. In the example below 70% of the capacity is used and 30% is available.

Minimum tare

You may restrict the taring by entering minimum tare value in to the parameter 518. In case of activated automatic taring, the instrument tares automatically if the loading is heavier than minimum tare.

Minimum weight for accurate weighing

The instrument produces data output or enables any feature, like printing, if the loading is heavier than minimum weight. This feature increases the accuracy of your system.

Next verification date

The instrument warns the operator on the following verification or calibration date, if date is entered. The warning is disappeared after pressing key until switch on the instrument again.

4.3 Alibi Memory

RELATED PARAMETERS: Main block 8--.

You can fulfill your weight data recording obligations with the alibi memory in certified operation without having paper archive. The weight data is saved into the alibi memory after every weighing operation together with date and time. The alibi record number may also be found on the printout data.
The alibi memory recording principle is a loop memory which is deletes the oldest record after the capacity limit 99 999 reached to overwrite the latest weighing. You can quickly access to the record of specific weighing by entering the suitable search criteria.

Activating Alibi Memory

1. Go to the parameter [8-- METROLOGY] main block in set up.
2. Press key 2 times to access parameter 811.
3. Press key after selecting YES in the parameter.
4. Press key until [SAVE : YES] prompt appears on the display and press key to save the changes into the memory. [E42 NEW ALIBI] message appears.
5. Press key to start Alibi memory.

How is the Data Recorded into the Alibi Memory?

After the following actions the transferred data is recorded into the alibi memory:

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

Recall Data from Alibi Memory

RELATED PARAMETERS: Parameter 813.

You may display the alibi record by selecting the criteria which are alibi number, date, net weight, gross weight or tare weight. You also may transfer 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 4 times to access parameter 813.
3. Select the suitable criteria by pressing or keys, which are NUM (Alibi number), DATE (weighing date), NET (net weight), GROS (gross weight), TARE (tare weight) or CN (consecutive number).

Alibi records displaying sequence on the display:
The alibi record of the selected weighing is displayed in the sequence below.

1. Alibi record number
2. Date

3. Time
4. Gross weight
5. Net weight
6. Tare weight
7. Consecutive number

Search with Alibi record number:

1. Press key after selecting NUM in parameter 813.
2. Press numerical 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 weighing.
5. Press key 4 times to return operation.

Search with date:

1. Press key after selecting DATE in parameter 813.
2. Press numerical keys to enter date in the printout data and press key. The date format entry should be as in the operation. e.g. date entry should be DDMMYY if parameter 251 is set to DMY. You may navigate in the alibi memory with or keys after entering the date.
3. The weighing data in the alibi memory is indicated on the display.
4. Press key to print this record and the previous nine weighing.
5. Press key 4 times to return operation.

Search with weight value:

1. Press key after selecting NET, gross or tare which is suitable in parameter 813.
2. Press numerical 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 weighing.
5. Press key 4 times to return operation.

Transfer all Alibi records

1. Go to the parameter [8-- METROLOGY] main block in set up.
2. Press key 5 times to access parameter 814.
3. Press or keys 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 6 times to access parameter 815.
3. Press key to print alibi information.

Format Alibi Memory

Warning : Alibi memory formatting should be done by authorized person. Otherwise erasing alibi memory may bring you undesired legal responsibility.

You may need to format alibi memory after installing the used SD card, to erase previous records before starting usage in legal or to erase alibi memory if you don't need previous records legally. This process runs if the calibration switch is at programming position.

1. Go to the parameter [8-- METROLOGY] main block in set up.
2. Press  key 7 times to access parameter 816.
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.

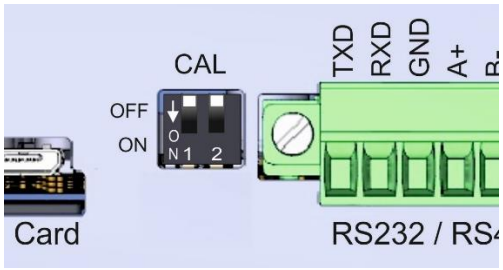
The empty fields are indicated as [-------] and transferred as [NO RECORD]; and the corrupted records are indicated as [Error] and transferred as [CORRUPTED].

5 PROGRAMMING AND CALIBRATION

You will find the programming and calibration procedure of FT-111 weighing indicator in this section. The arrow on navigation keys indicates the function of the keys in programming menu. The basic meanings of these keys are;

						
Navigation between parameters	Exit from any entry or block or from programming.	Go to previous block or parameter.	Next block.	Previous block.	Go to next block or parameter.	Enter the parameter to edit .
Parameters' value	Exit with previous value	Move to the left digit.	Next option or Increase the blanking digit	Previous option or Decrease the blanking digit	Move to the right digit.	Confirm and go to the next parameter.

A set-up DIP switch is located near the load cell connector at the FT-111 rear side as shown in the figure below and its position should be "ON" (downward) to change the metrological related parameters including calibration.



DIP Switch	Description
1	Calibration SW OFF : Locked ON : Set- up
2	Reserve

Figure 5.1- The location of calibration DIP switch.

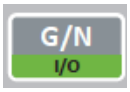
5.1 Entering to the Programming and Calibration

Enter the programming menu as described below. Legally related parameters can 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. If you will change any legally relate parameter or will perform calibration, set the calibration switch to the ON position before entering to the programming.

Display	Operation
[123.456 kg]	Press  key until [**PASSWORD :**] prompts seen.
[PASSWORD]	 keys sequentially for service entry.
[****]	Press  key.
[1—INTERFACE]	You entered to the programming main menu and the first main block [1—INTERFACE] prompt appears.

5.2 Quick Access Parameter Blocks used Frequently

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

Fast access key	Function
	Press this key to access the fieldbus parameters, Sub-block [19-].
	Press this key to access the digital inputs and outputs parameters, Sub-block [35-].
	Press this key to access the calibration, Sub-block [621].
	Press this key to access the diagnostic parameters, Main-block [9--].

5.3 Exit from Programming

Exit from programming after set-up the scale and calibration as described below.

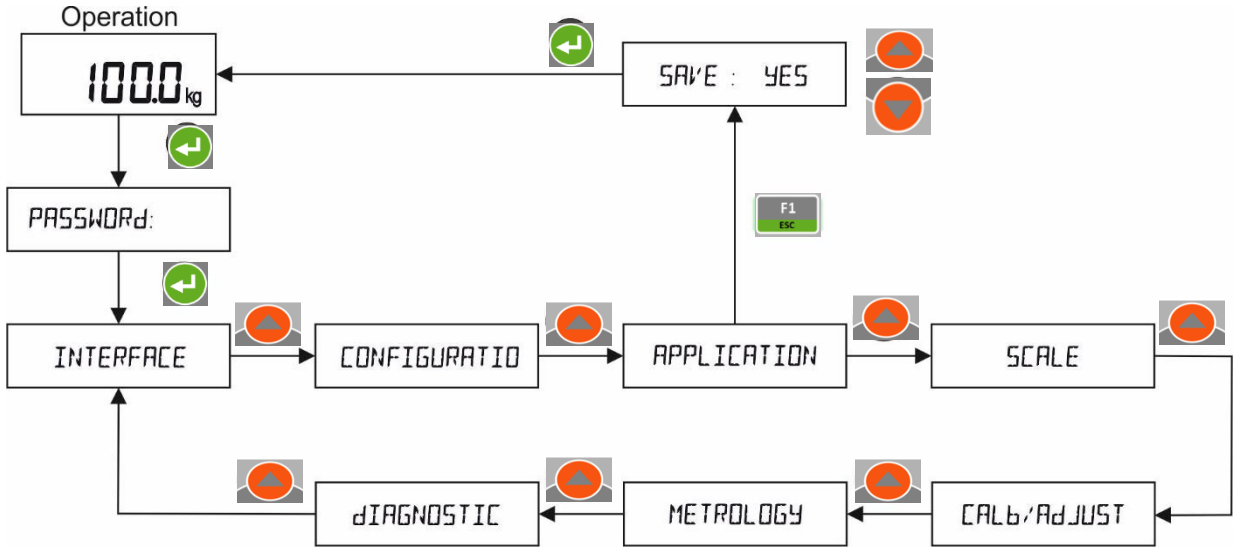
1. Press  key until [SAVE : YES] prompt appears on the display.
2. Press  key to save the changes into the memory or
3. Press  key to change item to [SAVE : NO], press  key to go out from programming without saving the changes or
4. Press  key to change item to [SAVE : BACK], press  key to return menu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

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

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

5.4 Programming and Parameters

FT-111 weighing indicator is programmed under the seven main blocks in the programming menu which are serial interface, configuration, application, scale, calibration, metrology and diagnostic.



Main blocks in the programming menu are displayed as [1-- INTERFACE] and sub-blocks are displayed as [11- RS232C]. 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 parameter to change, you may change its function by pressing ▲ or ▼ keys. If the value will be entered to the parameter press ▲ key to increase or press ▼ key to decrease the blanking digit and press ◀ or ▶ key to select digit then press ↵, press ▶ key to go to the next parameter.

For example, to change the Baud rate of RS422 serial interface to 57600;

1. After entering the programming, the [1-- INTERFACE] sub-block prompt appears. Press ▶ key.
2. [11- RS232C] prompt appears. Press ▲ key until [13- RS422] appears.
3. Press ▶ key until [132 BAUD: 9600] appears.
4. Press ▲ key until [132 BAUD: 57K6] appears.
5. Press ▶ key to enter the next parameter.

Legally related parameters can be changed if the calibration dip switch is at ON position. The values of these parameters are limited according the OIML against wrong set up. Legally related parameters are marked with **M** symbol as shown in the table below.

[1-- INTERFACE] Interface Block

[1-- INTERFACE]	**INTERFACE MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[11- RS232C]	**RS 232C SERIAL PORT** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[111 FORMAT : PRNT]	Data format of the serial port *Page 36, 19, 84* NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface MBHL : Modbus RTU High-Low format MBLH : Modbus RTU Low-High format
[*FLINTEC*]	Press →0← key to select output format different than Flintec continuous data format while the selection is CONT in the information display. Available functions are seen on the weight display after pressing →0← key sequentially. Press ↵ key after selecting the data format. Refer to Appendix 5 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. SARTOR : Commonly used by Sartorious. RINSTR : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. BASTER : Commonly used by Baster. LM2 : Flintec LM2 (BX1 par.000=6)
[112 BAUD : 9600]	Baud rate 1200 : 1200 19K2 : 19200 2400 : 2400 38K4 : 38400 4800 : 4800 57K6 : 57600 9600 : 9600
[113 LENGHT : 8]	Data Length 7 : 7 bits 8 : 8 bits
[114 PARITY : NO]	Parity 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 : YES]	Carriage return at continuous formats. NO : Carriage return disable YES : Carriage return enable
[117 LFEED : YES]	Line feed at continuous formats. NO : Line feed disable YES : Line feed enable
[118 DELAY : 50]	Data output delay at Modbus and BSI formats; delay between continuous format data. 000 .... 999 milliseconds.
[119 ADDRESS : 00]	Address of the port 00 .... 99. 00 means data format without address.
[12- RS485]	**RS 485 SERIAL PORT** 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 *Page 36, 19, 84* NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface MBHL : Modbus RTU High-Low format MBLH : Modbus RTU Low-High format
[*FLINTEC*]	Press →0← key to select output format different than Flintec continuous data format while the selection is CONT in the information display. Available functions are seen on the weight display after pressing →0← key sequentially. Press key after selecting the data format. Refer to Appendix 5 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. SARTOR : Commonly used by Sartorious. RINSTR : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. BASTER : Commonly used by Baster. LM2 : Flintec LM2 (BX1 par.000=6)
[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 : YES]	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 Modbus and BSI formats; delay between continuous format data. 000 .... 999 milliseconds.
[129 ADDRESS : 01]	Address of the port 00 .... 99. 00 means data format without address.
[13- RS422]	**RS 422 SERIAL PORT** 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 *Page 36, 19, 84* NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface MBHL : Modbus RTU High-Low format MBLH : Modbus RTU Low-High format
[*FLINTEC*]	Press →0← key to select output format different than Flintec continuous data format while the selection is CONT in the information display. Available functions are seen on the weight display after pressing →0← key sequentially. Press ↵ key after selecting the data format. Refer to Appendix 5 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. SARTOR : Commonly used by Sartorious. RINSTR : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. BASTER : Commonly used by Baster. LM2 : Flintec LM2 (BX1 par.000=6)

[132 BAUD : 9600]	Baud rate 1200 : 1200 19K2 : 19200 2400 : 2400 38K4 : 38400 4800 : 4800 57K6 : 57600 9600 : 9600
[133 LENGHT : 8]	Data Length 7 : 7 bits 8 : 8 bits
[134 PARITY : NO]	Parity NO : No parity ODD : Odd parity EVEN : Even parity
[135 CSUM : NO]	Checksum at continuous and BSI formats. NO : Checksum disable YES : Checksum enable
[136 CR : YES]	Carriage return at continuous formats. NO : Carriage return disable YES : Carriage return enable
[137 LFEED : YES]	Line feed at continuous formats. NO : Line feed disable YES : Line feed enable
[138 DELAY : 50]	Data output delay at Modbus and BSI formats; delay between continuous format data. 000 .... 999 milliseconds.
[139 ADDRESS : 00]	Address of the port 00 .... 99. 00 means data format without address.
[13A DUBLEX : HALF]	Duplex on the interface HALF : Half duplex (select for RS485) FULL : Full duplex
[14- USB]	**USB** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[141 FORMAT : NO]	Data format of the serial port *Page 36, 19, 84* NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output BSI : BSI format for PC, PLC interface
[*FLINTEC*]	Press →0← key to select output format different than Flintec continuous data format while the selection is CONT in the information display. Available functions are seen on the weight display after pressing →0← key sequentially. Press ↵ key after selecting the data format. Refer to Appendix 5 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. SARTOR : Commonly used by Sartorious. RINSTR : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. BASTER : Commonly used by Baster. LM2 : Flintec LM2 (BX1 par.000=6)
[142 CSUM : NO]	Checksum at continuous and BSI formats. NO : Checksum disable YES : Checksum enable
[143 CR : YES]	Carriage return at continuous formats. NO : Carriage return disable YES : Carriage return enable
[144 LFEED : YES]	Line feed at continuous formats. NO : Line feed disable YES : Line feed enable
[145 DELAY : 50]	Data output delay at BSI formats; delay between continuous format data. 000 .... 999 milliseconds.
[15- ETHERNET]	**ETHERNET TCP/IP** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[151 FORMAT : NO]	Data format of the Ethernet port *Page 36, 19, 84* NO : Port is disabled CONT : Continuous data output FAST : High speed continuous data output PRNT : Printout BSI : BSI format for PC, PLC interface MBHL : Modbus TCP High-Low format MBLH : Modbus TCP Low-High format
[*FLINTEC*]	Press →0← key to select output format different than Flintec continuous data format while the selection is CONT in the information display. Available functions are seen on the weight display after pressing →0← key sequentially. Press ↵ key after selecting the data format. Refer to Appendix 5 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. SARTOR : Commonly used by Sartorious. RINSTR : Commonly used by PT, Rinstrum, HBM, GSE. AVERY : Commonly used by Avery E1205. BASTER : Commonly used by Baster. LM2 : Flintec LM2 (BX1 par.000=6)
[152 IP : 250]	IP address. Default is 192.168.016.250

[153 ADDRESS : 01]	Address of the port 00 .... 255. 00 means data format without address.
[154 SUB MASK : 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 : 222]	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 means disable. 01.... 60 sec.
[15C CR-LF : YES]	Carriage return and Line feed at continuous formats. NO : Disable YES : Enable
[15D DELAY : 050]	Data output delay at demand formats; delay between continuous format data. 000 .... 999 milliseconds.
[15E REMOTEIP : 000]	Remote IP address. Default is 0.0.0.0
[15F REMOTEPO : 0]	Remote port. 0 65535
[16- PRINTER]	**PRINTER** 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 *Page 36* 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 KEY : Printing with key LOCK : Print interlock. Only one time printout, if weight change is more than 10 division. AUTO : Auto print, if the gross load is bigger than MIN WEIGHT and stable. Unload and load the scale for next printing. LOAD : Autoprint if W>MIN WEIGHT and weight change is more than 10d.
[163 PRT MSG : NO]	Display " PRINTING " message at printout NO : Disable YES : Enable
[164 CN : YES]	Ticket number on printout. NO : Disable YES : Enable
[165 DATE : YES]	Date printing on printout. NO : Disable YES : Enable
[166 TIME : YES]	Time printing on printout. NO : Disable YES : Enable
[17- LABEL SETUP]	**LABEL SETUP** 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. Maximum 20 characters. *Page 87*
[172 HEADER2 :]	Header of printout, the second line. Maximum 20 characters. *Page 87*
[173 HEADER3 :]	Header of printout, the third line. Maximum 20 characters. *Page 87*
[174 FOOTER1 :]	Footer of printout, the first line. Maximum 20 characters. *Page 87*
[175 FOOTER2 :]	Footer of printout, the second line. Maximum 20 characters. *Page 87*
[176 LF BEFO : +2]	Line feed before printout. : + = Forward , - = Backward : NO,1,2....9 : Line feed quantity before data. Example: +2 means 2 line feed forward.

[177 LF AFTE : +4]	Line feed after printout. : + = Forward , - = Backward : NO,1,2....9 : Line feed quantity 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
[19- ANALOG OUT]	**ANALOGUE OUTPUT** (Only FT-111 AN) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 esc key to go to the next main-block.
[191 TYPE : 4-20]	Analog output type 4-20 : 4 mA - 20 mA 0-20 : 0 mA - 20 mA 0-10 : 0 VDC- 10 VDC 0-5 : 0 VDC- 5 VDC
[192 MINIMUM : 00.0]	The minimum of the analogue output. Default 00.0 means the minimum output is not drifted. e.g. enter 1.0 to set output to 1.0 volt at 0 kg in 0 -10 V range.
[193 MAXIMUM : 00.0]	The maximum of the analogue output. 00.0 means the maximum output is not drifted. e.g. enter 9.0 to set output to 9.0 volt at Max load in 0 -10 V range.
[194 SOURCE : GROS]	Source of the analogue output GROS : Gross weight INDI : Indicated weight
[195 ZERO ADJ :]	Displays the count value of unloaded scale. Increase or decrease by pressing ▲ or ▼ ; or press ▶ key to enter the value by related keys to change the unloaded scale output.
[196 SPAN ADJ :]	Displays the count value of the full loaded scale. Increase or decrease by pressing ▲ or ▼ ; or press ▶ key to enter the value by related keys to change the analogue output gain.
[197 AUTO ADJ : NO]	Set analogue output to calibration range NO : No YES : Automatic adjustment between min and max limits if changed.

[19- PROFIBUS]	**PROFIBUS CONFIGURATION** (Only FT-111 PB) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[191 FORMAT : INTG]	Data format of the Profibus INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[192 ADDRESS : 001]	Node address 001...125
[19- PROFINET]	**PROFINET CONFIGURATION** (Only FT-111 PN) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[191 FORMAT : INTG]	Data format of the Profinet INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[192 IP : 250]	IP address of Ethernet port. Default is 192.168.16.250
[194 SUB MASK : 000]	Subnet mask address of Ethernet port. Default is 255.255.255.000
[195 GATEWAY : 253]	Gateway address. Default is 192.168.16.253
[196 S. NAME : SCAL]	Station (device) name. Default is SCALE-1
[19A MAC ADR :]	MAC address AA:BB:CC:DD:EE:FF
[19- CANOPEN]	**CANOPEN CONFIGURATION** (Only FT-111 CO) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[191 FORMAT : INTG]	Data format of the CANopen INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[192 ADDRESS : 001]	Node address 001...127
[19- ETHERNET IP]	**ETHERNET/IP CONFIGURATION** (Only FT-111 EI) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[191 FORMAT : INTG]	Data format of the EtherNet/IP

	INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[192 IP : 250]	IP address of Ethernet port. Default is 192.168.16.250
[194 SUB MASK : 000]	Subnet mask address of Ethernet port. Default is 255.255.255.000
[195 GATEWAY : 253]	Gateway address. Default is 192.168.16.253
[19A MAC ADR :]	MAC address AA:BB:CC:DD:EE:FF
[19- ETHERCAT]	**ETHERCAT CONFIGURATION** (Only FT-111 EC) 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.
[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]	**CC-LINK CONFIGURATION** (Only FT-111 CC) 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.
[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]	**POWERLINK CONFIGURATION** (Only FT-111 PL) 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.
[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

[19- CC-LINK IE]	**CC-LINK IE CONFIGURATION** (Only FT-111 IE) Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[191 FORMAT : INTG]	Data format of the CC-Link IE Field. INTG : Signed 32 bit integer, no decimal point implied. FLOA : 32 bit float, decimal point implied.
[192 STATION : 001]	Station number. 001...120
[193 NETWORK : 001]	Network number. 001...239

[2-- CONFIGURATIO] Configuration Block

[2-- CONFIGURATIO]	**CONFIGURATION MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[21- DSPLY ACUSTI]	**DISPLAY AND ACOUSTIC** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[211 LIGHT : ON]	Backlight OFF : Backlight disabled. ON : Always bright. AUTO : Automatic backlight to increase the battery life.
[212 COLOR : TURQ]	Backlight color at basic weighing WHIT : White LGRE : Light Green GREE : Green TURQ : Turquoise BLUE : Blue YELL : Yellow AMBE : Amber RED : Red
[213 KEYSOUN : YES]	Key sound NO : Disable YES : Enable
[214 REFRESH : 5]	Display refresh rate X : 1...9 times/sec
[22- INFO DISPLAY]	**INFORMATION DISPLAY** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[221 TIME : D+T]	Information data on the right of the alphanumeric display.

	NO : No clock data on the display. T : Display time, D : Display date, D+T : Display date and time,
[222 DATA : TARE]	Information data on the left of the alphanumeric display. NO : No data TARE : Tare weight is displayed GROS : Gross weight is displayed in Net
[23- START UP]	**START UP** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[231 TARING : MULT]	*Page 33* Taring. 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.
[232 AUTO T : NO]	*Page 33* Auto taring. NO : Disabled. YES : Auto tare, if the gross load is bigger than MIN TARE and stable.
[233 AUTO CLR : NO]	*Page 33* Auto clear. 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 at power off and the indication is start in NET after switch on the instrument.
[235 FILTER : MEDI]	Adaptive digital filter. NO : Disable. Fastest weighing; but the most sensitive to environmental vibrations. VLOW : Very low filtering LOW : MEDI : Low filter HIGH : Medium filter VHIG : High filter Very high filter. Slowest and the most stable weighing.
[236 LANGUAGE : ENG]	User language. ENG : English DEU : Deutsch FRA : Français ITA : İtaliano ESP : Espagnol TUR : Türkçe
[237 NET SIGN : NO]	Net sign correction at displaying and printing. NO : Disabled. YES : Enabled.

[24- KEY 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 * KEY : UNIT]	The function of * key. NO : Disable SET : Setpoint value entry RPRN : Reprint DYNA : Dynamic weighing start/reset PEAK : Basic PEAK displaying HOLD : HOLD displaying UNIT : Unit change
[25- ENTRIES]	**ENTRIES** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[251 DATE : DMY]	Date format *Page 35* DMY : DD.MM.YYYY MDY : MM.DD.YYYY YMD : YYYY.MM.DD
[252 DATE SET :]	Date setting *Page 35* XX.XX.XX
[253 TIME SET :]	Time adjust *Page 35* HH:MM
[254 CN :]	Consecutive number *Page 87* 1...65535
[255 S. NAME : SCAL]	Scale name. Maximum 16 characters. Default is SCALE-1

[3-- APPLICATION] Application Block

[3-- APPLICATION]	**APPLICATION RELATED PARAMETERS MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[33- DYNAMIC]	**WEIGHING OF UNSTABLE LOADS** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[331 OPERATE : NO]	Operation type *Page 34* NO : Disable KEY : Dynamic weighing starts after repressing 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.
[332 FILTER : 3.0]	Dynamic filtering time. X.X seconds.
[34- KEY LOCK]	**KEY LOCK** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[341 UP KEY : USE]	Setpoint key locking USE : Not locked LOCK : Locked
[342 DOWN : USE]	Memory key locking USE : Not locked LOCK : Locked
[343 RIGHT : USE]	Right arrow key locking USE : Not locked LOCK : Locked
[344 LEFT : USE]	Left arrow key locking USE : Not locked LOCK : Locked
[345 ENTER : USE]	Enter key locking USE : Not locked LOCK : Locked
[346 * KEY : USE]	* key locking USE : Not locked LOCK : Locked
[347 G/N : USE]	G/N key locking USE : Not locked LOCK : Locked
[348 HIGH : USE]	High resolution key locking USE : Not locked LOCK : Locked
[349 TARE : USE]	Tare key locking USE : Not locked LOCK : Locked
[34A CLEAR : USE]	Clear key locking USE : Not locked LOCK : Locked
[34B ZEROING : USE]	Zeroing key locking USE : Not locked LOCK : Locked

[35- DIG INPUTS]	**DIGITAL INPUTS** (appears if option installed) Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[351 INPUT 1 : NO]	*Page 72,* Input 1 NO : Not used ZERO : Zeroing TARE : Taring CLR : Clear PRNT : Print LOCK : Key lock DYST : Dynamic weighing start DYRE : Dynamic weighing reset PEAK : Basic PEAK displaying HOLD : HOLD displaying FBUS : Remote Input over fieldbus or BSI command.
[352 INPUT 2 : NO]	*Page 72,* Input 2 :
[353 INPUT 3 : NO]	*Page 72,* Input 3 :
[354 INPUT 4 : NO]	*Page 72,* Input 4 :

[36- DIG OUTPUTS]	**DIGITAL OUTPUTS** (appears if option installed) Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[361 OUT 1 : NO]	*Page 73,* Digital output 1 NO : Disable S AIN : Absolute Indicated weight S IND : Indicated weight S ANE : Absolute net weight S NET : Net weight S GRO : Gross weight SPC1 : Control mode-1 SPC2 : Control mode-2 STAB : Weighing is stable NET : Net weighing ZR I : Zero range of indicated weight ZR G : Zero range of gross weight RUN : In usage ERRO : Error FBUS : Remote Output over Fieldbus or BSI
	Press →0← key to select output function if you need function different than basic setpoint output and active high level. Available functions are seen on the weight display. Press ↵ key after set up the output function. Refer to Section 7.2 for details. (only at SAIN, SIND, SANE, SNET, SGRO)

[*BAS-HI*]	BAS-HI : Basic setpoint output, active high BAS-LO : Basic setpoint output, active low THR-HI : Threshold, active high THR-LO : Threshold, active low VIN-HI : VIN-LO : Window, active high Window, active low
[362 OUT 2 : NO]	Digital output 2 *Page 73,* :
[363 OUT 3 : NO]	Digital output 3 *Page 73,* :
[364 OUT 4 : NO]	Digital output 4 *Page 73,* :
[365 OUT 5 : NO]	Digital output 5 *Page 73,* :
[366 ZR [d] : 1.0]	Zero range in XX.X division. Default is 1.0 d. *Page 80* 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.
[367 OUTPUTS : IMME]	Output changing. IMME : Immediately change even scale is not stable. STAB : Change if the scale is stable.

[5-- SCALE] Scale Block

The following blocks are related to the measurement related parameters and describe the use of a scale. An important parameter is 511 which limits the use of the parameters in main blocks 5, 6 and 8. The selections of this parameter are;

IND	Industrial weighing	Selections of parameters at set up and calibration are free for industrial usage 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 gross
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 you set any parameter out of 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 perform calibration carefully due to sealing of the scale in legal usage.

[5-- SCALE]		**SCALE RELATED PARAMETERS MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[51- SET UP]		**SCALE SET UP** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[511 APROVAL : IND]	M	Approval IND : Industrial. All parameters can be freely selected. INDG : Industrial weighing of tank, hopper or silo in gross. (Taring, AZTrack and Power on Zero are disabled) INDN : Industrial weighing in Net of tank, hopper or silo. (disabled AZT and Power on Zero, enabled Tare) OIML : OIML approved scale.
[512 HIGHRES : TOGG]	M	High resolution *Page 34,* TEMP : Temporary indication with key. TOGG : Toggle. Start and end high resolution by pressing key in sequence. ALWA : Always high resolution
[513 PWR ZERO : NO]	M	Power on zero. 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. *Page 32* NO : Disable. 2% : ± 2% 3% : ± 3% 20% : ± 20% 50% : ± 50%
[515 AZTRACK : 0.5d]	M	Automatic zero tracking. *Page 32* NO : Disable. 0.3d : ± 0,3d 0.5d : ± 0,5d 1d : ± 1d 2d : ± 2d 3d : ± 3d
[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 accepted as a stable to process, If the scale is stable during this time. 0.1.... 9.9 seconds.
[518 MIN TARE : 20]		Minimum tare for automatic taring Taring can be done if loading is heavier than MIN TARE.
[519 MINWEIGT : 20]		Minimum weight to produce printout The printout is produced if the load is heavier than MIN WEIGHT.
[51A TILT : NO]	M	Tilt switch to prevent wrong weighing results in mobile scales. (Digital Input-4) NO : Not used. OPEN : Normally open contact. CLOS : Normally closed contact.
52- BUILD]		**SCALE BUILD** Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to the next sub-block or press F1 ESC key to go to the next main-block.
[521 UNIT : KG]	M	The scale unit *Page 34* Select NO, g, kg, t, lb, klb, N or kN.
[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 :] MAX1/d1 MAX2/d2 MAX3/d3	M	Scale capacity Max and division Enter scale capacity and division after press ↵ key. Capacities and divisions of MR and MI scales are entered as Max1, d1, Max2, d2, Max3, d3.
[524 OVER : 9d]	M	Limit of Indication NO : Over indication after Max 1d : 1 division more than Max 5d : 5 division more than Max 9d : 9 divisions more than Max 2% : 2% more than Max 5% : 5% more than Max
[525 TARETYPE : SUB]	M	Tare type. SUB : Subtractive tare. Taring reduces the maximum net. ADD : Additive tare. Taring is limited to MaxTare and Net weighing is done up to Max.
[526 MAXTARE : 0.0]	M	Maximum tare at additive tare. Enter the maximum tare of the scale which is written on the marking label as; T= + XXXX.X at additive tare Default is 0.0 which means no limit.

53- DLC SETUP]		**DIGITAL LOAD CELL SETUP (Only FT-111 D)** 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 digital load cell Enter the quantity of DLC used in the scale. The quantity can be entered between 1 and 30.
[533 ADDRESSING]	M	Addressing of digital load cells Enter serial number after press F1 ESC key.
[54- SHIFT ADJUST]		**SHIFT / ECCENTRICITY ADJUSTMENT (Only FT-111 D)** Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main-block.
[541 METHOD : CELL]	M	Adjustment method CELL : Individual load cell shift adjust PAIR : 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

[6-- CALIB / ADJUST]		**SCALE ZERO AND SPAN SETTING MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[61- CALIBRATION]		**CALIBRATION** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[611 TEST WEIGHT]	M	Scale calibration with test weight
[612 LINEARIZATIO]	M	Multipoint scale calibration to increase linearization
[613 ELECTRONIC]	M	eCal electronic calibration without test weight

[62- ADJUSTMENT]		**ADJUSTMENTS** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[621 ZERO ADJUSTM]	M	Zero adjustment
[622 SPAN ADJUSTM]	M	Span adjustment
[623 S UNDER LOAD]	M	Span adjustment of loaded scale Span adjustment under load Span adjustment with temporary zeroing
[624 GRAVITY CAL]	M	Gravity acceleration of the place of the calibration.
[625 GRAVITY USAG]	M	Gravity acceleration of the place of the usage.
[63- COEFFICIENTS]		**CALIBRATION COEFICIENTS** Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main block.
[631 LOAD COEFFIC]	M	The load weight used at the calibration is indicated here.
[632 ZERO COEFFIC]	M	This coefficient is determined the zero point of the scale.
[633 GAIN COEFFIC]	M	This coefficient is related with the gain factor of the scale.

[8-- METROLOGY] Metrology Block

[8-- METROLOGY]		**METROLOGY MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[81- ALIBI MEMORY]		**ALIBI MEMORY** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[811 ALIBI : NO]	M	Alibi memory *Page 36* NO : Disable YES : Enable
[812 PORT : PRNT]		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.
[813 ACCESS : NUM]		Access to the Alibi memory record *Page 36*

		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
[814 TRANSFER : NO]		Transfer Alibi memory records *Page 37* NO : No ALL : Transfer alibi memory record to the printer port
[815 ALIBI ABOUT]		Transfer alibi memory information. *Page 37*
[816 FORMAT : NO]	M	Format alibi memory SD card. *Page 37* NO : No YES : Start formatting alibi SD card. *Attention: Only authorized person !!!*
[82- INFORMATION]		**METROLOGIC INFORMATION** Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main block.
[821 CAL COUNTER]		This counter announces interfering quantity to the instrument with 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.
[822 CONFIG COUNT]		This non-resetable and protected counter announces interfering quantity to the instrument. Count number increases at every exit from set-up mode.
[823 NEXT VERIFIC]		Date of the next verification

[9-- DIAGNOSTIC] Diagnostic Block

[9-- DIAGNOSTIC]	**DIAGNOSTIC MAIN BLOCK** Press ▲ key sequentially to access this main block, or press ▶ key or ↵ key to enter configuration parameters, or press ▲ key to go to the next block, or press F1 ESC key to exit from programming.
[91- HARDWARETEST]	**HARDWARE TESTING** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[911 KEY]	Key testing
[912 RS232]	RS232C serial port testing
[913 RS485]	RS485 serial port testing
[914 RS422]	RS422 serial port testing

[915 USB]		USB port testing
[916 IN / OUT]		Digital Input / Output testing
[917 DISPLAY]		Display testing
[918 LC SIGNAL mV]		Load cell signal measuring in millivolt (only FT-111)
[918 DLC COUNTS]		Internal count values of the digital Load cell(s) (only FT-111 D)
[919 PRINTER]		Printer testing
[92- HISTORY]		**HISTORY** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[921 PEAK LOAD]		The last 20 peak loads listed in this parameter.
[922 UNDER LOGS]		The last 20 under errors listed in this parameter.
[923 ERROR LOGS]		The last 20 errors listed in this parameter.
[924 ENTRY LOGS]		The last 20 Service/User entry listed in this parameter.

[97- FIRMWARE]		**FIRMWARE INFORMATION** Press ▶ key or ↵ key again to enter this menu. Or press ▲ key to go to the next sub-block.
[971 INSTRUMENT]		XX.XX
[972 OPTION]		XX.XX
[973 UPGRADE]	M	Firmware upgrade Call Flintec service or dealer to upgrade.
[974 DLC BOARD]		XX.XX (only FT-111 D)
[99- DEFAULT]		**DEFAULTS LOADING** Press ▶ key or ↵ key again to enter this menu. Press ▲ key to go to beginning of the sub-block or press F1 ESC key to go to the next main block.
[993 PARAMET DEF]	M	Load parameter's default (Calibration do not change)
[994 FACTORY DEF]	M	Load factory defaults
[995 DEFAULT ADDR]	M	Load default address to digital load cell. (only FT-111 D)

	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. *WARNING: The DLC must be disconnected from the network and connect as single.*

5.5 Calibration

Calibration involves emptying the scale then placing a known test weight on the empty platform and allowing FT-111 to capture values for zero and span. Calibration is performed as;

1. Press key at the [611 TEST WEIGHT] prompt to start the calibration.
2. At the [UNLOAD THE PAN] prompt, remove any weight on the platform, then press key.
3. The terminal automatically starts to capture zero and the [WAIT] message appears during zero adjustment.
4. The test weight value will be used for the calibration shown on the display as [LOAD THE SCALE] [XXXXXX] after zero adjustment. Enter the test weight value pressing key to increase or key to decrease the blanking digit and press or key to select a digit. A minimum test load requirement is 20% of scale capacity for accurate calibration. FLINTEC recommends test load between 50% to 75% of the capacity.
5. Place the test weight on the scale.
6. Press key to start span calibration. [WAIT] message will appear on the display 10 seconds while span calibration is being performed.

5.5.1 Linearity Correction

In some cases a multipoint calibration may help to improve the performance of the scale.

1. Press key at the [612 LINEARIZATIO] prompt to start the calibration.
2. At the [UNLOAD THE PAN] prompt, remove all weights from the platform, then press key.
3. The terminal automatically starts to capture the zero and the [WAIT] message appears during zero adjustment.
4. At the [LOAD 1] [XXXXXX] prompt, a test weight value is suggested on the display for the first step calibration. A test load requirement is between 35% to 60% of capacity. Load the scale and enter the test weight value via pressing key to increase or press key to decrease the blanking digit and press or key to select a digit.
5. Place the test weights or another practical weight on the scale.
6. Press key to start the span calibration. [WAIT] message appears on the display for 10 seconds while the first span calibration is being performed.
7. At the [LOAD 2] [XXXXXX] prompt, a test weight value is suggested on the display for the second step calibration. Place a test weight on the platform at least 90% of scale capacity, preferable at scale capacity. Enter the weight value by pressing key to increase or press key to decrease the blanking digit and press or key to select a digit.
8. Press to start the second step span calibration. [WAIT] message appears on the display for 10 seconds while the span calibration is being performed.

5.5.2 Zero and Span Adjustments

In this sub-block you can only perform zero adjustment or span adjustment automatically without performing full calibration. Do not perform span calibration if eCal electronic calibration.

Automatic Zero Adjustment

1. Press key at the [621 ZERO ADJUSTM] prompt to start the zero adjustment.
2. At the [UNLOAD THE PAN] prompt, remove all weights from the platform, then press key.
3. The terminal automatically starts to capture zero and the [WAIT] message appears during zero adjustment.

Automatic Span Adjustment

1. Press key at the [622 SPAN ADJUSTM] prompt to start the span adjustment.
2. At the [LOAD THE SCALE] [XXXXXX] prompt, a test weight value is suggested on the display for the first step calibration. Enter the test weight value via pressing key to increase or press key to decrease the blanking digit and press or key to select a digit. A minimum test load requirement is 20% of scale capacity for accurate calibration. FLINTEC recommends test load between 50% to 75% of the capacity.
3. Place the test weights on the scale.
4. Press to start span calibration. [WAIT] message appears on the display 10 seconds during span calibration.

Automatic Span Adjustment Under Load

This parameter is being used to perform span adjustment of a scale without lifting the load on it. This operation is especially used for span adjustment tank / silo which have some material in it. You can make span adjustment without emptying the tank.

1. Press key at the [623 S UNDER LOAD] prompt to start the span adjustment under load.
2. [P.ZERO] prompt appears on the display to indicate the scale load will be determined as temporary zero.
3. Press key and the display will show [WAIT] message during temporary zero adjustment.
4. At the [LOAD THE SCALE] [XXXXXX] prompt, the test weight value will be used for the calibration shown on the display. Enter the test weight value pressing key to increase or press key to decrease the blanking digit and press or key to select a digit. A minimum test load requirement is 20% of scale capacity for accurate calibration. FLINTEC recommends test load between 50% to 75% of the capacity. Sum of the preload of the scale and test weight must be less than capacity.
5. Place the test weights on the scale.
6. Press to start span calibration. [WAIT] message appears on the display for 10 seconds during span calibration.
7. Zero adjustment is recommended after emptying the scale.

5.5.3 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 span adjustment by entering the load cell data.

WARNING : If the primary unit is not kg, the selected unit should be saved exiting from the set-up and then perform e-Cal.

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

This parameter lets you to perform calibration without using any test weights. A/D coefficients of the indicator 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] (only FT-111)
[XXXXXX]
Enter total load cell capacity via pressing ▲ key to increase or press ▼ key to decrease the blanking digit and press ◀ or ▶ key to select a digit and press ↵ key to go to the next step.

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

[AVARAGE LC OUT] (only FT-111)
[XXXXXX]
Enter load cell output in mV/V via pressing ▲ key to increase or press ▼ key to decrease the blanking digit and press ◀ or ▶ key to select a digit. 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) ÷ 4 = 1.9999 mV/V.

[ZERO ADJUST]
If the scale is empty and you want to make automatic zero adjustment instead of entering estimated dead load (see next step), press ↵ key, [UNLOAD THE PAN] appears and press ↵ key to start zero calibration after unloading the scale. The display will show [WAIT] message during zero adjustment. In this while 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 ▲ key before pressing the ↵ key.

[ESTIM DEAD LOAD]
[XXXXXX]
Enter the dead load value of the weighing system in current unit by related 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 →0← 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.

5.5.4 Gravity adjustment

WARNING: This parameter should ONLY be used at the scale that will be initially verified in two stages by gravity adjustment in legal metrologic applications.

The gravity acceleration values of the place of the calibration and of the place of the usage are entered in this parameter.

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

5.5.5 Calibration coefficients

Calibration coefficients are calculated after calibration and saved to 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.

6 DIGITAL LOAD CELL (DLC)

6.1 Addressing Digital Load cells

IMPORTANT NOTE: You can connect all RC3D to the terminal and address them later.

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.

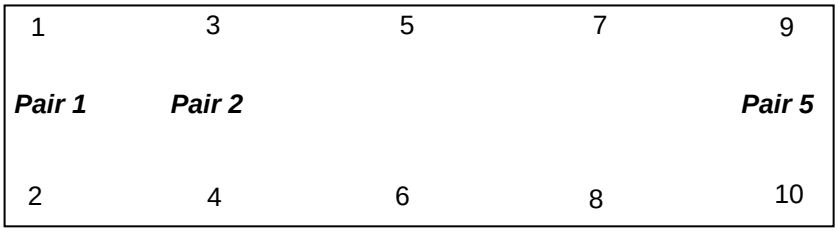


Figure 6.1 - The addressing principle of the digital load cells.

Addressing of RC3D digital load cells

1. Press key at the [533 ADDRESSING] prompt to start the addressing.
2. At the [WAIT] prompt for a short time and then [DLC NUMBER :01] message 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, type the serial number value via pressing key to increase or key to decrease the blanking digit and press or key to select a digit.
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 following DLC number seen on the display. You may press key to enter the serial number and you may 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 seen on the display and press key to save the changes into the memory.

Manually Addressing of an invidual RC3D digital load cell

The manual addressing of load cell is done to change any load cell or to change the instrument without performing shift adjustment and calibration.

1. Press key at the [533 ADDRESSING] prompt to start the addressing.
2. At the [WAIT] prompt for a short time and then [DLC NUMBER :01] message appears to indicate load cell address.
3. Press key until appearing the address which the new load cell will install.
4. Connect the new load cell to junction box.
5. Press key to start address 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 seen on the display, then press key. [532 QUANTITY :XY] message appears.
8. Press key to access to Shift adjustment block or press key until [SAVE : YES] prompt seen on the display and press key to save the changes into the memory.

Shift adjustment method

The shift adjustment is done to eliminate weight reading differences at placing the load on different positions on the platform. The 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 is rolling loads on the platform like truck scales. Sectional pairs adjustment is more easy 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 all weights from 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 F1 ESC key to exit.
4. Press F1 ESC 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 give service to 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 F1 ESC 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 F1 ESC key until [SAVE : YES] prompt seen on the display.
3. Press key to save the changes into the memory.

7 DIGITAL INPUTS AND OUTPUTS

APPLICATION: Digital inputs are used to control the instrument and the digital outputs can be used to control gates, valves etc. or to produce alarm.

Setpoint outputs can be updated by actual displayed weight or when the load is stable.

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

You may enter limit values of the item after pressing  key or you may call them from the Memory. Set Memory has a capacity for 500 pcs item records. Each item has 5 set entries which depends on the application. This section describes the functions of digital ports.
Additionally, 

key can be programmed to access setpoint entry menu easily for frequent usage.

The digital inputs and outputs are programmable to use them as a Remote IO of PLC over 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.

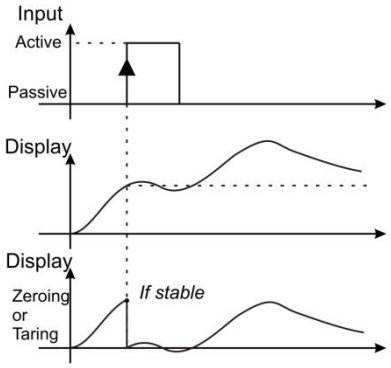
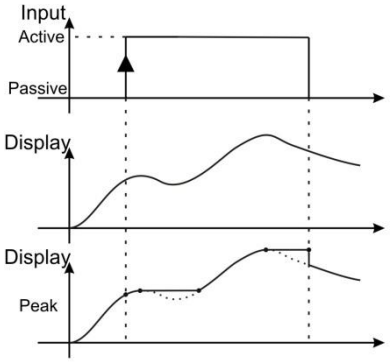
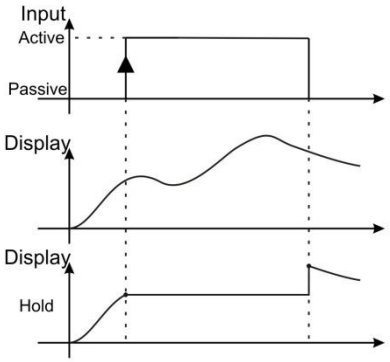
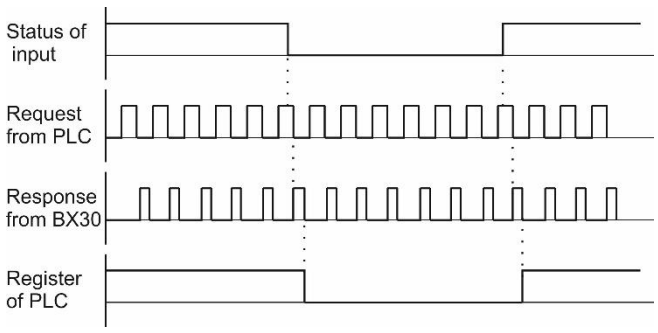
Digital inputs and outputs are configurable as indicated in the table below.

In / Out	Descriptions	Related parameter
Input 1	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, peak hold, hold, Remote Input over Fieldbus.	351
Input 2	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, peak hold, hold, Remote Input over Fieldbus.	352
Input 3	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, peak hold, hold, Remote Input over Fieldbus.	353
Input 4	Zeroing, Taring, Clear, Print, Key lock, Dynamic Start and Reset, peak hold, hold, Remote Input over Fieldbus.	354
Output 1	Various functions for Setpoint1, Zero Range, Stable, Error, Remote output over fieldbus.	361
Output 2	Various functions for Setpoint1, Zero Range, Stable, Error, Remote output over fieldbus.	362
Output 3	Various functions for Setpoint1, Zero Range, Stable, Error, Remote output over fieldbus.	363
Output 4	Various functions for Setpoint1, Zero Range, Stable, Error, Remote output over fieldbus.	364
Output 5	Various functions for Setpoint1, Zero Range, Stable, Error, Remote output over fieldbus.	365

Digital inputs and outputs are set to their functions in sub-blocks 35- and 36-. Digital inputs can be programmed for zeroing, taring, print etc. in sub-block 35-. Digital outputs can be programmed for the different functions as described below.

7.1 Digital inputs

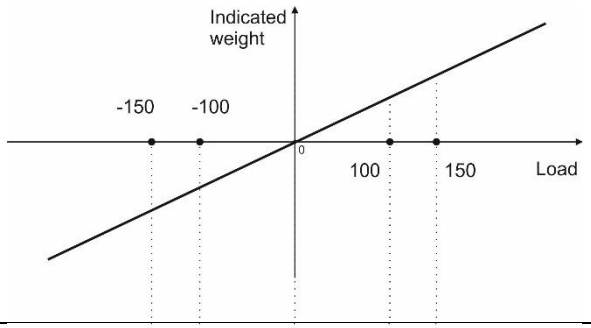
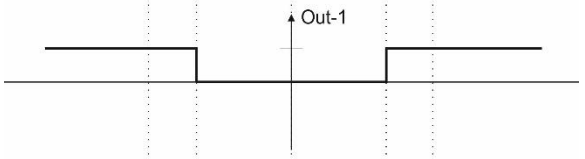
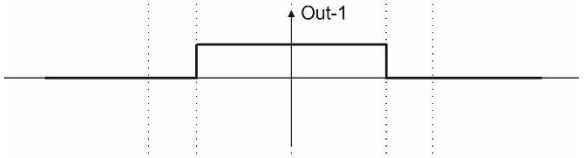
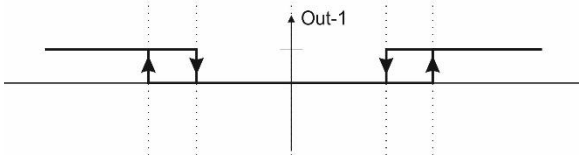
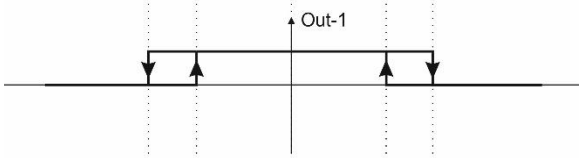
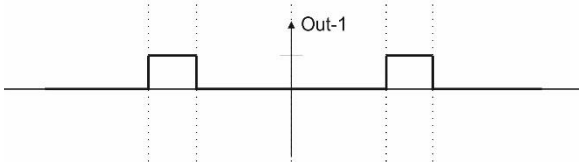
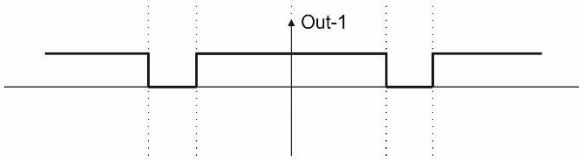
Digital inputs can be used instead of pressing keys for taring, zeroing, clear tare, transfer data etc. as seen below. Basic Peak on the display and Hold display are the additional input functions.

Key functions via inputs Zeroing, Taring, Clear, Print The key functions are executed via digital inputs. Taring via digital input is shown in the drawing as an example.	
Basic Peak The instrument follows the peak of the loading during the input signal. Not for legal usage.	
Hold The instrument holds the weight indication during input signal which help the measured value to the operator for a while. Not for legal usage.	
Remote Input over Fieldbus or BSI 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.	

7.2 Digital outputs

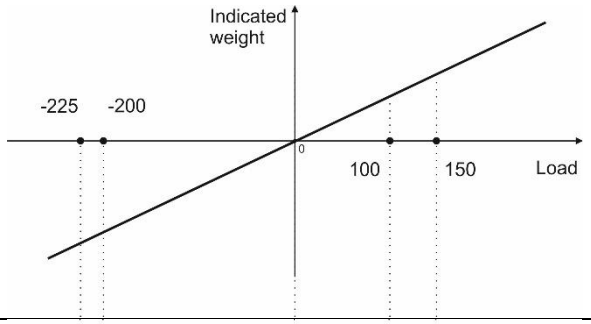
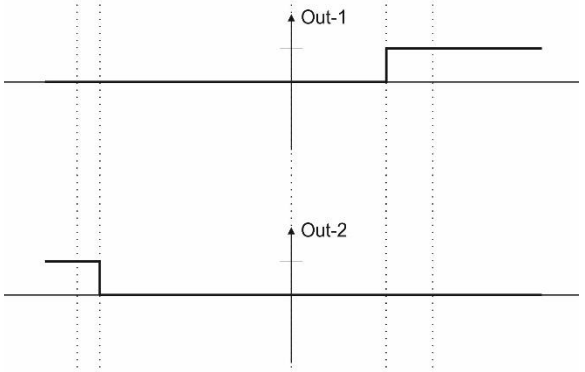
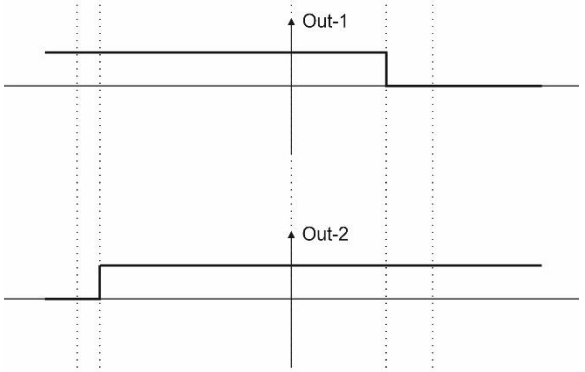
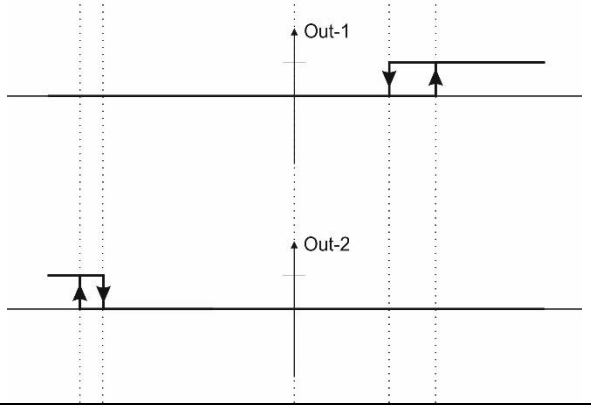
Digital outputs can be programmable as free setpoints which can be programmed for different functions as seen below. The output (s) can be produced as threshold or window additional to the well-known basic output at free programmable setpoints.

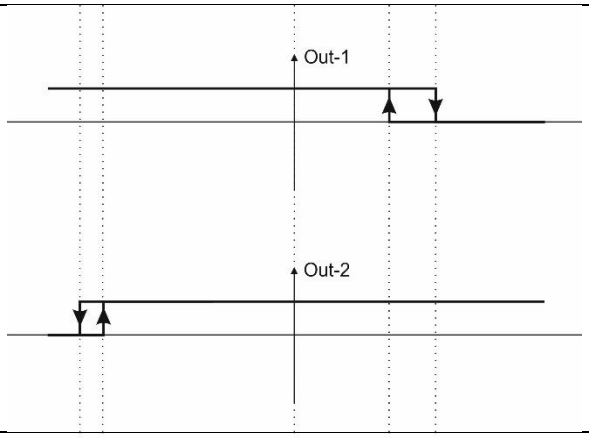
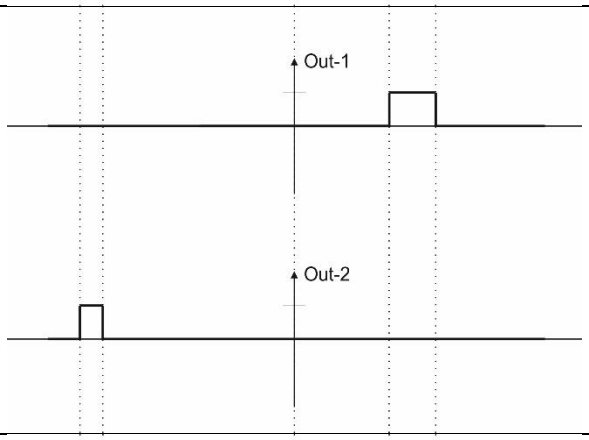
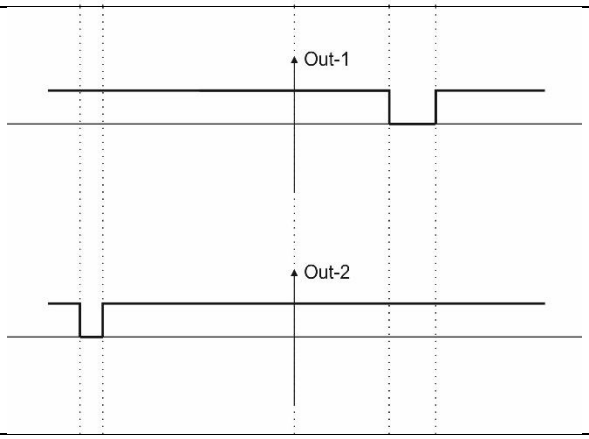
S AIN Free setpoint of absolute indicated weight
The status of the digital output changes with comparing the set point value and absolute indicated weight value as seen below.

As an example, if SP1 = 100 kg or SP1 LOW = 100 kg and SP1 HIGH = 150 kg.	
BAS-HI Basic, active high Output is high if absolute indicated weight is heavier than setpoint. (Default)	
BAS-LO Basic, active low Output is low if absolute indicated weight is heavier than setpoint.	
THR-HI Threshold, active high Output goes to high if absolute indicated weight is heavier than setpoint high. Returns the low if the weight is less than setpoint low.	
THR-LOW Threshold, active low Output goes to low if absolute indicated weight is heavier than setpoint high. Returns the high if the weight is less than setpoint low.	
VIN-HI Window, active high Output goes to high if absolute indicated weight is between setpoint high and setpoint low.	
VIN-LOW Window, active low Output goes to low if absolute indicated weight is between setpoint high and setpoint low.	

S IND Free setpoint of indicated weight

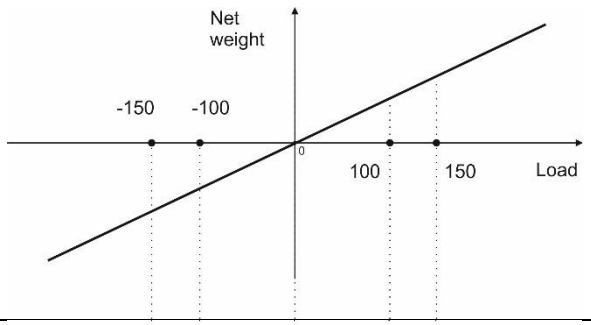
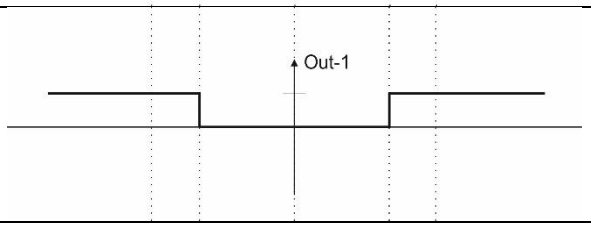
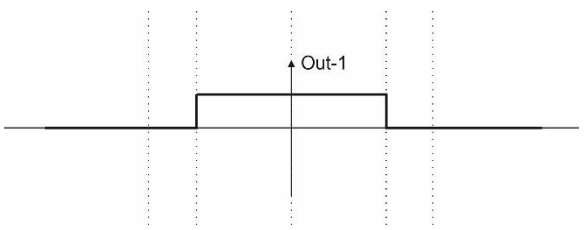
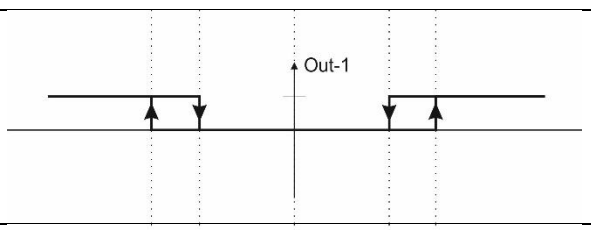
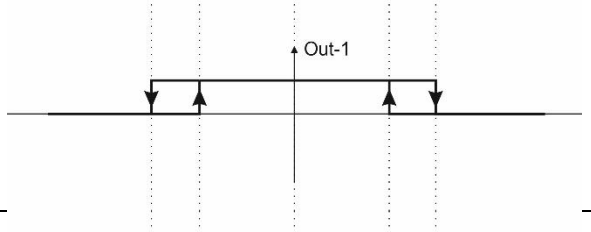
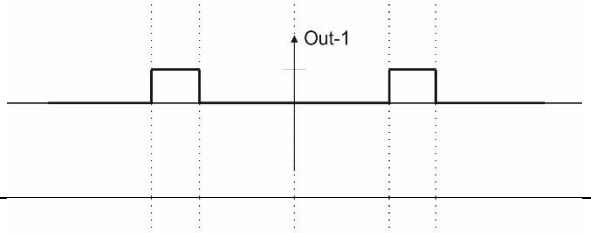
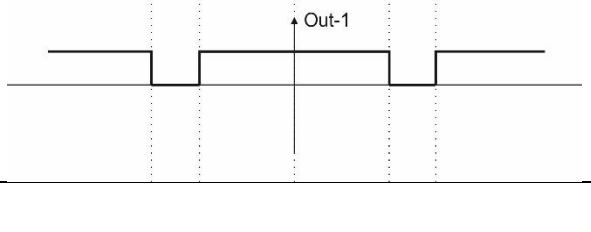
The digital output is activated with comparing the set point value and indicated weight value as seen below.

As an example, if SP1 = 100 kg or SP1 LOW = 100 kg SP1 HIGH = 150 kg SP2 = -200kg or SP2 LOW = -200kg SP2 HIGH = -225kg	
BAS-HI Basic, active high Output is high if indicated weight is heavier than setpoint. (Default)	
BAS-LO Basic, active low Output is low if indicated weight is heavier than setpoint.	
THR-HI Threshold, active high Output goes to high if indicated weight is heavier than setpoint high. Returns the low if the weight is less than setpoint low.	

THR-LOW Threshold, active low Output goes to low if indicated weight is heavier than setpoint high. Returns the high if the weight is less than setpoint low.	
VIN-HI Window, active high Output goes to high if indicated weight is between setpoint high and setpoint low.	
VIN-LOW Window, active low Output goes to low if indicated weight is between setpoint high and setpoint low.	

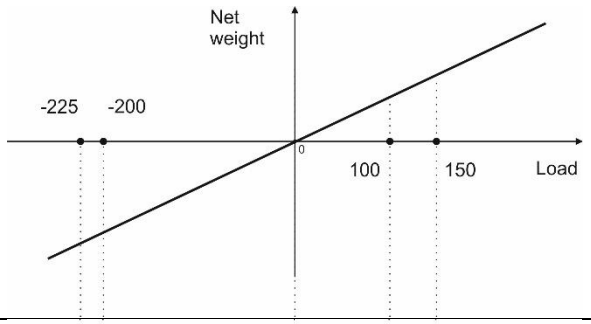
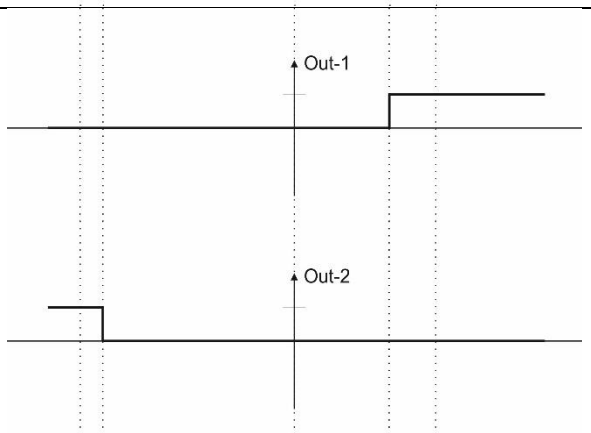
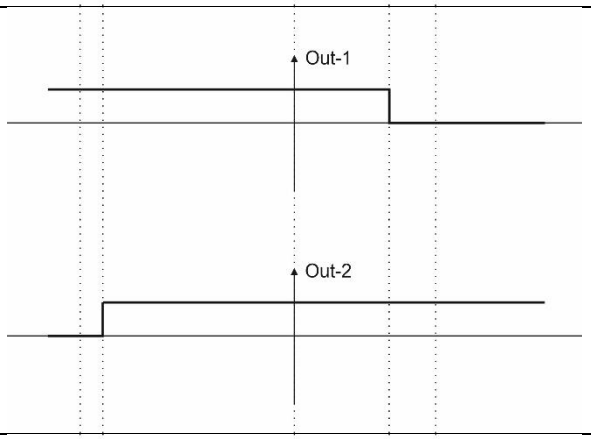
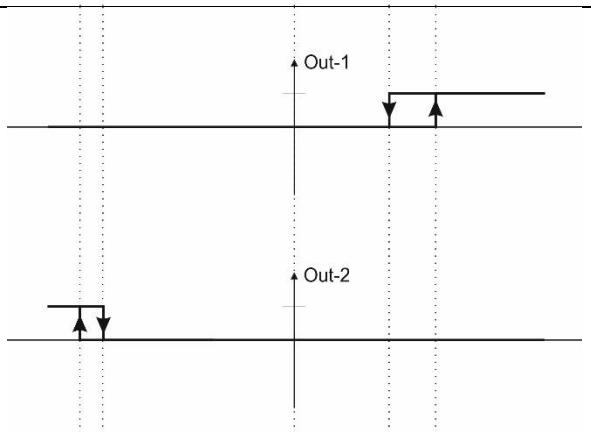
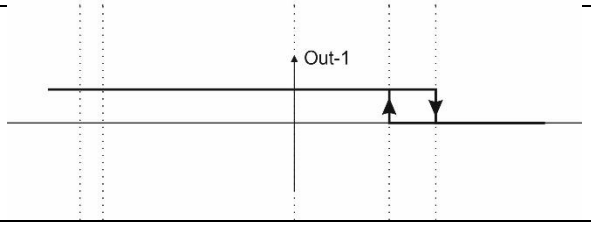
S ANE Free setpoint of absolute net weight

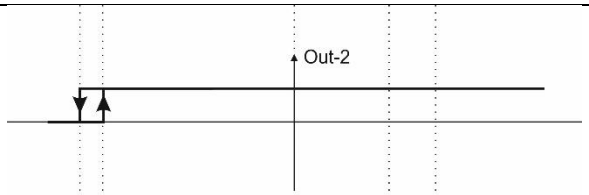
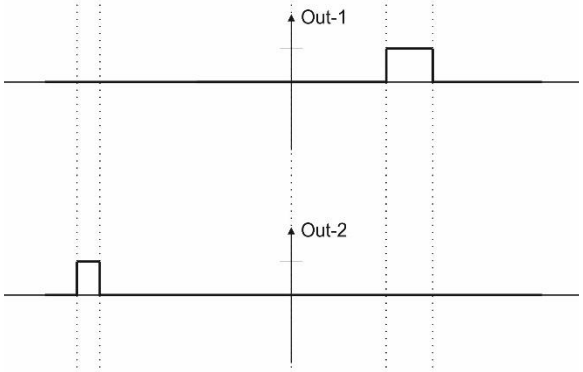
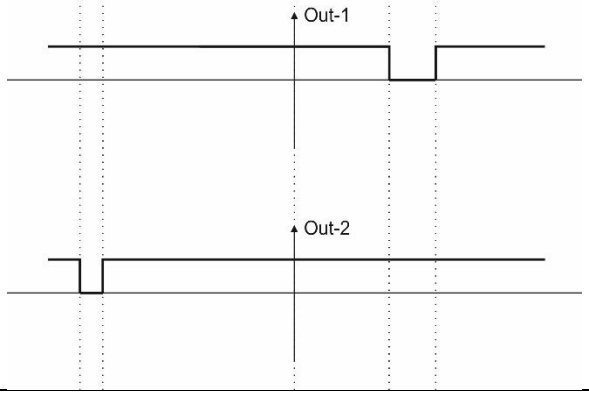
The digital output is activated with comparing the set point value and absolute net weight value as seen below.

As an example, if SP1 = 100 kg or SP1 LOW = 100 kg SP1 HIGH = 150 kg.	
BAS-HI Basic, active high Output is high if absolute net weight is heavier than setpoint. (Default)	
BAS-LO Basic, active low Output is low if absolute net weight is heavier than setpoint.	
THR-HI Threshold, active high Output goes to high if absolute net weight is heavier than setpoint high. Returns the low if the weight is less than setpoint low.	
THR-LOW Threshold, active low Output goes to low if absolute net weight is heavier than setpoint high. Returns the high if the weight is less than setpoint low.	
VIN-HI Window, active high Output goes to high if absolute net weight is between setpoint high and setpoint low.	
VIN-LOW Window, active low Output goes to low if absolute net weight is between setpoint high and setpoint low.	

S NET Free setpoint of net weight

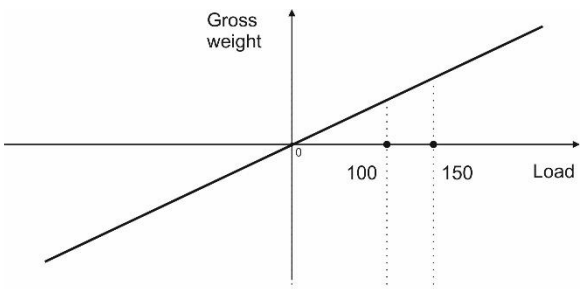
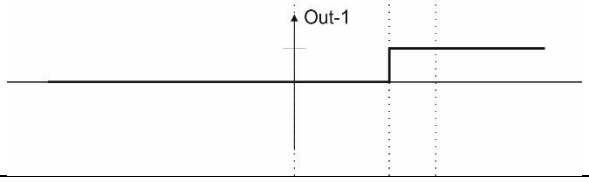
The digital output is activated with comparing the set point value and net weight value as seen below.

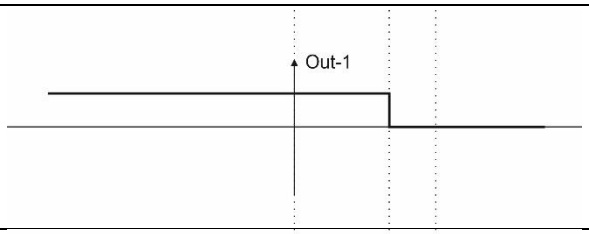
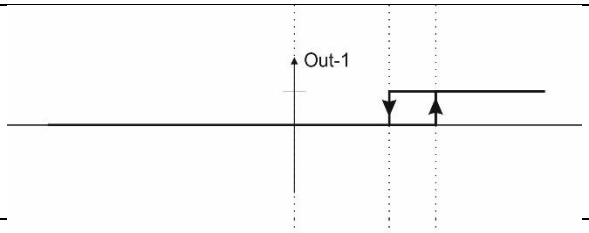
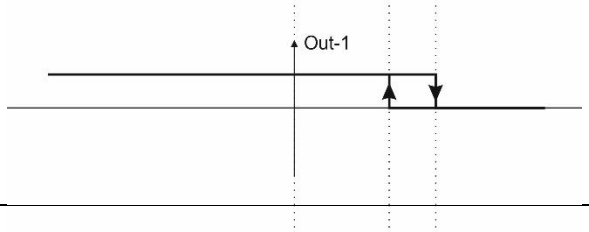
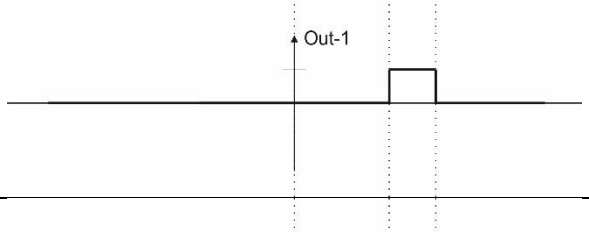
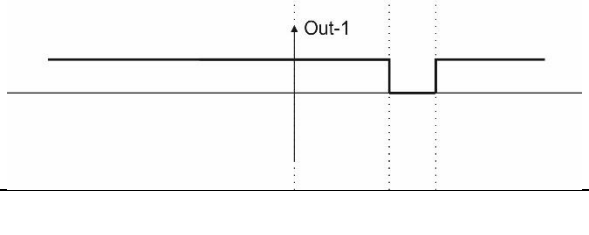
As an example, if SP1 = 100 kg or SP1 LOW = 100 kg SP1 HIGH = 150 kg SP2 = -200kg or SP2 LOW = -200kg SP2 HIGH = -225kg	
BAS-HI Basic, active high Output is high if net weight is heavier than setpoint. (Default)	
BAS-LO Basic, active low Output is low if net weight is heavier than setpoint.	
THR-HI Threshold, active high Output goes to high if net weight is heavier than setpoint high. Returns the low if the weight is less than setpoint low.	
THR-LOW Threshold, active low Output goes to low if net weight is heavier than setpoint high. Returns the high if the weight is less than setpoint low.	

	
VIN-HI Window, active high Output goes to high if net weight is between setpoint high and setpoint low.	
VIN-LOW Window, active low Output goes to low if net weight is between setpoint high and setpoint low.	

S GRO Free setpoint of gross weight

The digital output is activated with comparing the set point and weight at gross weight indication as seen below.

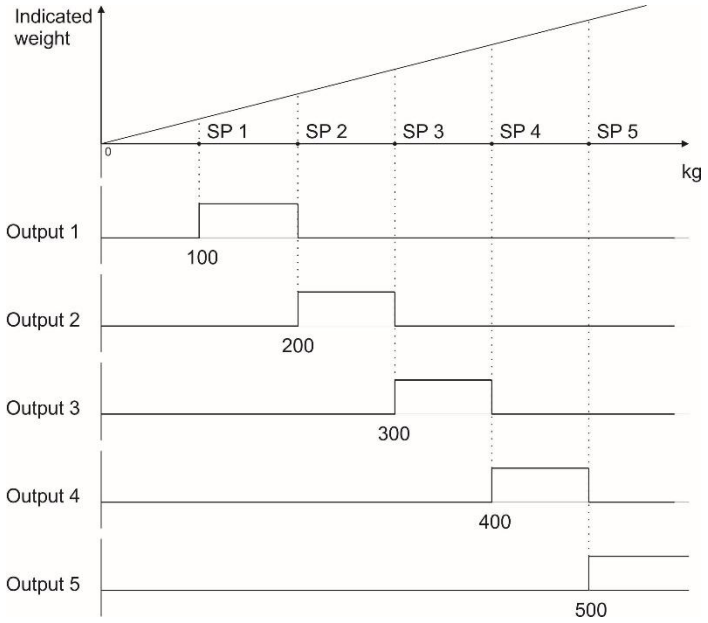
As an example, if SP1 = 100 kg or SP1 LOW = 100 kg SP1 HIGH = 150 kg.	
BAS-HI Basic, active high Output is high if gross weight is heavier than setpoint. (Default)	

BAS-LO Basic, active low Output is low if gross weight is heavier than setpoint.	
THR-HI Threshold, active high Output goes to high if gross weight is heavier than setpoint high. Returns the low if the weight is less than setpoint low.	
THR-LOW Threshold, active low Output goes to low if gross weight is heavier than setpoint high. Returns the high if the weight is less than setpoint low.	
VIN-HI Window, active high Output goes to high if gross weight is between setpoint high and setpoint low.	
VIN-LOW Window, active low Output goes to low if gross weight is between setpoint high and setpoint low.	

SPC1 Control mode-1

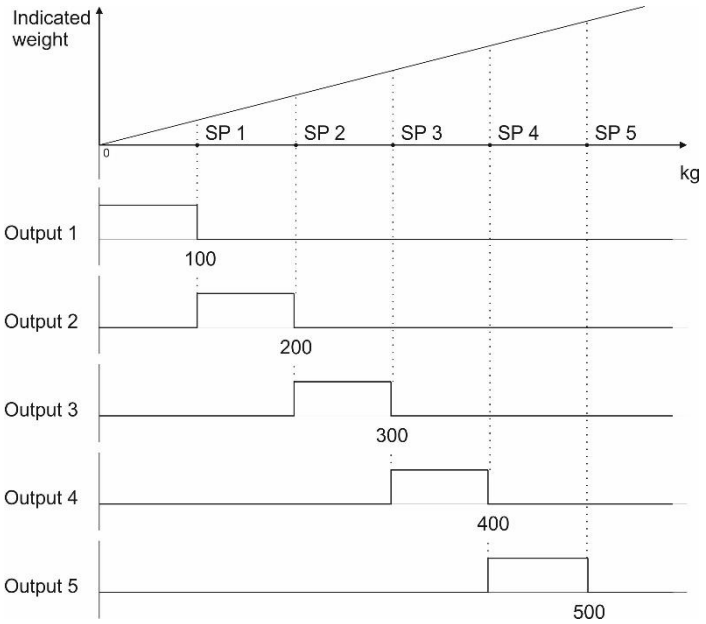
The digital outputs are activated as seen below, if setpoints are set up to Control mode-1 and their values are entered consequently from setpoint 1 to the setpoint N how much needed.

Digital outputs which are not used at this mode can be programmed freely to any other function. For example if SP5 is not needed to control, it can be programmed to the zero range to produce empty signal.



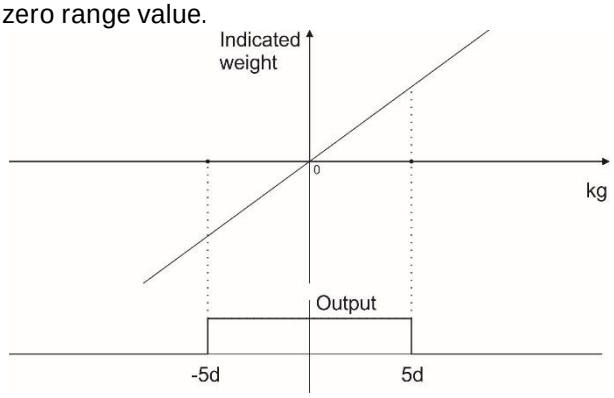
SPC2 Control mode-2

The digital outputs are activated as seen below, if setpoints are set up to Control mode-2 and their values are entered consequently from setpoint 1 to the setpoint N how much needed.
Digital outputs which are not used at this mode can be programmed freely to any other function. For example if SP5 is not needed to control, it can be programmed to the zero range to produce empty signal.



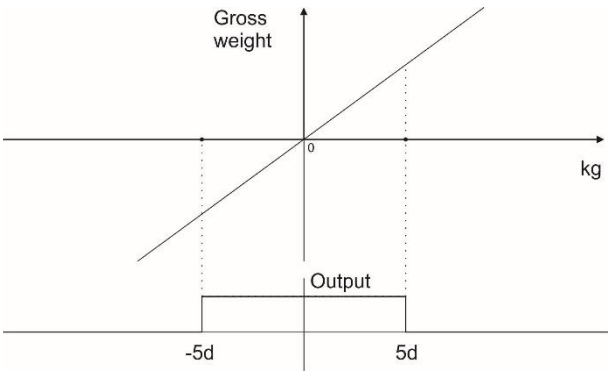
ZR I Zero range of the indicated weight

The digital output is activated if the absolute indicated weight value is in the zero range. Refer to parameter 366 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 366 to enter zero range value.



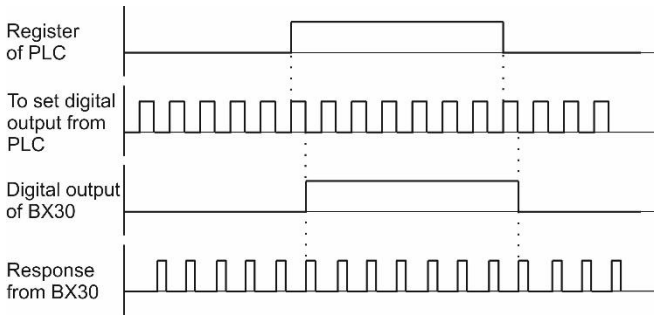
Stable
The digital output is activated at the displayed weight value is stable.

Run
The digital output is activated during the weighing indicator is in operation. The output is low in power on cycle and in setup modes.

In Net Mode
The digital output is activated during net weight indication.

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

Remote Output over 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.



Entry the limit values

1. Press the key.
2. The setpoint 1 value appears as shown on the display [SP 1 1250 kg].
3. Press key to increase or press key to decrease the blanking digit and press or key to select a digit. You may press CLEAR key to enter negative setpoint 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 F1 ESC key to return operation at any step.

Entry setpoint of items 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 [SET : 111].
3. Enter the new memory code by pressing key to increase or press key to decrease the blanking digit and press or key to select a digit and press key to enter the item.
4. The first limit value is appear 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 pressing key to increase or press key to decrease the blanking digit and press or key to select digit and press the key.
6. Repeat step 4 and 5 until entering values to other three limit value of the group.
7. After entering the value of 5th setpoint value press key to go next memory code.
8. Or press F1 ESC key to exit.

Select limits of item from SET memory

1. Press  key. The last used setpoint value appears on the display [SP1 1250 kg].
2. Press  key for more than 2 seconds. The last used Set memory code appears on the display [SET : 111].
3. Enter the memory code of the item by pressing  key to increase or press  key to decrease the blanking digit and press  or  key to select a digit and press  key.
4. The selected Set memory data is loaded after displaying values.
5. Or press  key to exit without loaded.

8 SERIAL DATA OUTPUTS

FT-111 weighing indicator has RS232, RS485, RS422, USB 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 ASCII codes of **P(print), Z(zero), T(tare) or C(clear)** letters to the serial port of FT-111; it will act like the related key is pressed.

8.1 Continuous Data Output

Continuous data output of the instrument is transmitted in the following data structure. The serial ports of FT-111 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 command and response and only 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)									
Bits 0, 1 and 2				Bits 3 and 4			Bit 5	Bit 6	Bit 7
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.*

8.1.1 Continuous Data Formats

RELATED PARAMETERS: Parameters 111, 121, 131, 141 and 151.

Continuous data output can be programmed to some common formats besides Flintec continuous formats. To select one of the described formats below press the →0← key sequentially. Press ↵ key to go to the next parameter.

Flintec®

Character number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Description		STX	STA	STB	STC	Indicated weight						Tare weight						CR	LF	CHK
Example-1	ASCII	☻	}	1	0			0	7	5	0				2	5	0			♠
	Hex	02	7D	31	30	20	20	30	37	35	30	20	20	20	32	35	30	0D	0A	06

Function	Description									
STX	Start of transmission character.									
STA STATUS A)	**Bit 7**	**Bit 6**	**Bit 5**	**Bits 4 and 3**			**Bits 2,1 and 0**			
	Always 0	Always 1	Always 1	4	3	Increment	2	1	0	Decimal point
				0	1	x 1	0	0	0	XXXX00
				1	0	x 2	0	0	1	XXXXX0
				1	1	x 5	0	1	0	XXXXXX
							0	1	1	XXXXX.X
							1	0	0	XXXX.XX
							1	0	1	XXX.XXX
							1	1	0	XX.XXXX
							1	1	1	X.XXXXX
STB (STATUS B)	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**		
	Always 0	1 = Zeroed with power on zerp	Always 1	Always 1	1 = Unstable	1 = Error (1)	0 = Weight negative	1= Net		
		0 = Not power on zeroed			0 = Stable	0 = No Error	0 = Weight positive	0 = Gross		
STC (STATUS C)	Always 0 as ASCII (30 hex).									
Indicated Weight	These seven characters are a string containing the current weight not including the decimal point.									
Tare Weight	These seven characters are a string containing the tare weight not including the decimal point.									

CR	Carrige Return.
LF	Line Feed.
CHK	Checksum byte. Checksum calculation is; CHK (Checksum) = 0 – (STX + STATUS A + ... + LF)

(1) Error Messages: UNDER, OVER, A.OUT, L-VOLT and TILT are represented in Indicated data fields as left aligned.

HBM®

Description	STX	Sign	Indicated weight							S1	S2	S3	S4	Unit			ETX
Example	☻				0	.	7	5	0	N			1	k	g		♥

Toledo®

Description	STX	A	B	C	Indicated weight						Tare weight						CR	LF	CHK
Example	☻	}	1	0			0	7	5	0				2	5	0			♠

SysTec®

Description	Status		Indicated weight										SP	Unit		CR	LF
Example	S							0	.	7	5	0		k	g		

SMA

Description	LF	S	R	N	M	F	Indicated weight										Unit			CR
Example			1	N								0	.	7	5	0	k	g		

Function	Description
LF	Line Feed (0A hex)
S	Z = Centre of zero, O = Over cap, U = Under cap, E = Weight not currently being displayed. " "*(space)* = None of the above conditions.
R	Range. 1 = First range, 2 = Second range, 3 = Third range.
N	Mode. G = Gross weight, T = Tare weight, N = Net weight, g = Gross weight in increased resolution. n = Net weight in increased resolution.
M	Motion. M = Motion, " "*(space)* = No motion.
F	Always a space as ASCII (20 hex).
Indicated Weight	These ten characters are a string containing the current weight including the decimal point.
Unit	Unit of weight value are kg, g, lb, klb, N or kN as left aligned.
CR	Carrige Return (0D hex)

Sartorious®

Description	Ignore						Sign	SP	Indicated weight							SP	Unit			CR	LF
Example							+					0	.	7	5	0		k	g		

Rinstrum®

Description	STX	Sign	Indicated weight							ST	ETX
Example	☻				0	.	7	5	0	N	♥

Avery® E1205

Description	STX	Indicated weight							SP	Unit		SP	ST	CR	LF	ETX
Example	☻			0	.	7	5	0		k	g		N			♥

Baster®

Description	Indicated Weight							LF
Example			0	.	7	5	0	

LM2

Character number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Description	Indicated Weight								Unit		SP	NET			LF	CR
Example-1				0	.	7	5	0	K	g		N	E	T	L_F	C_R
Example-2				1	.	0	0	0	K	g	L_F	C_R				

Function	Description
Indicated Weight	These eight characters are a string containing the current weight not including the decimal point.
Unit	Unit of weight value are Kg, G, Lb, N or KN as left aligned.
SP	Only sent a space character in Net operation. Otherwise there is no any character.
NET	These three characters are only sent in Net operation. Otherwise there is no any character.
LF	Line Feed (0A hex)
CR	Carrige Return (0D hex)

8.2 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. You may reduce the data transfer speed by increasing the delay between data output packages.

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 unstable and 123.4)
M+000123.4	(Dynamic weighing result is 123.4)
----------	(Dynamic weighing in calculating)
+	(Overload)
-	(Under load)
O	(ADC out error)

8.3 Print Mode

The format of the data output in Print mode can be selected in 5 different type forms 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, or via Ethernet port by setting remote IP and remote port number, refer to parameter 19E and 19F.

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 PC or to any host. The data output structure is;

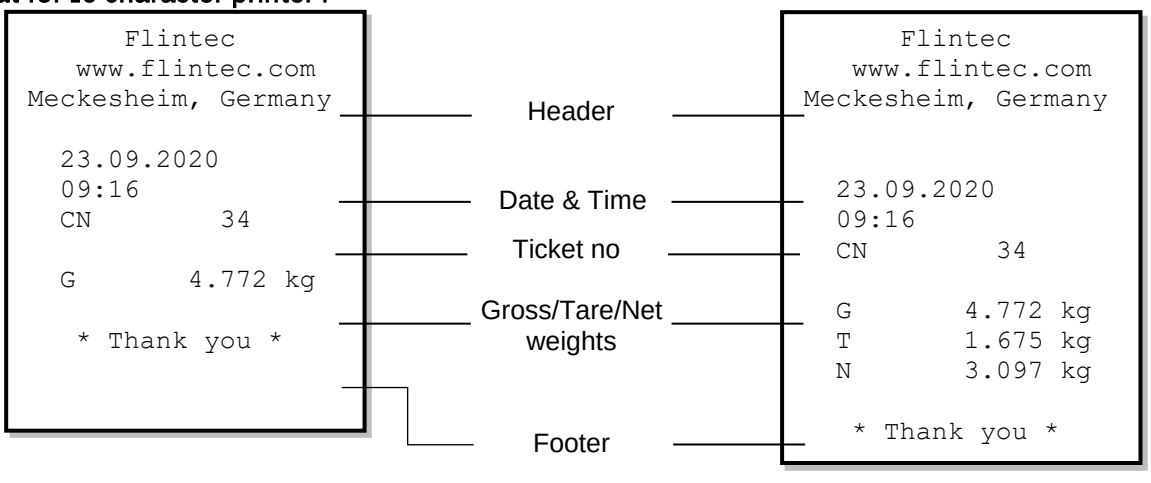
CN: 71 G: 3.007kg T: 1.001kg N: 2.006kg *ALB: 5*

DATE		TIME		CN		GROSS		TARE		NET		ALB	C R	L F
10	3	5	3	9	3	13	3	13	3	13	4	12	1	1

MULTI LINE

You can send the data in multiple line formats as seen 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.

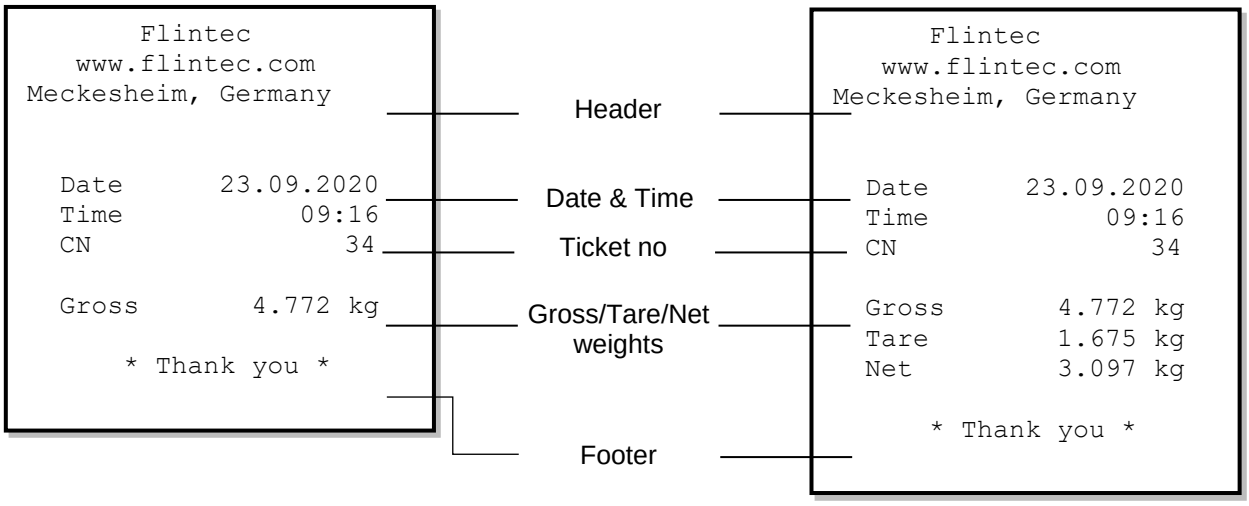
Format for 16 character printer :



16F1 – Includes only Gross or Net weight value

16F2 – Includes Gross or Gross\ Tare\Net weight values

Format for minimum 26 or more character printer :



26F1 – Includes only Gross or Net weight value

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

8.4 EPL Format

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

You can design your label in EPL format by using the printer label design software and Flintec software as describe below.

1. Connect FT-111 weighing indicator to Indface2x set up PC software.
2. Enter EPL print format window. You will find the command table which includes commands to get data from weighing in 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 into Flintec set up PC software window.
6. Load this file into weighing indicator.

Figure 8.1- Sample of the label printout of FT-111 which is designed in EPL format.

8.5 BSI Data Structure for Dialog with PC

FLINTEC weighing indicators launched on the market support the standardized command set BSI data form, depending on the functionality of the instrument. This easy data format gives the reliable and speedy interface advantages with communicating PLC or PC for process control, or transactional applications.
BSI is divided into 2 levels which are;

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

If you will integrate FT-111 into your computer or if you will interface FT-111 with your PLC which do not have any fieldbus interface, using BSI commands will help you to expand your system with additional FLINTEC scale without having to change your application programs.

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 the following:
[ADR][COMMAND][CHK][CR][LF]

Response format with weight:
A general description of the response is the following;
[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
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 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]
Print :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]

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'

8.5.1 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.

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.

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 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)
01UA96 (Input 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-8	IN-7	IN-6	IN-5	IN-4	IN-3	IN-2	IN-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	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)
01VA96 (Output 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-8	OUT-7	OUT-6	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	9				6			

W	Write (Set/Reset) digital outputs

Command : [ADR][W][Outputs]
Response : [ADR][W][STATUS]
Example :
Command : 01W96
Response : 01WA (Outputs 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'.
The parameter of output(s) must be programmed as 'FBUS' for this feature *(Page 56)*.

OUTPUTS	OUT-8	OUT-7	OUT-6	OUT-5	OUT-4	OUT-3	OUT-2	OUT-1
Bit wise	1	0	0	1	0	1	1	0
ASCII	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 cannot work in net weighing.
Weight must be in zeroing range for all operating modes.
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

8.6 Modbus RTU and TCP/IP

***IMPORTANT NOTE**: Modbus RTU and Modbus TCP interfaces require Modbus SD card at the SD2 card slot on the rear of the instrument.*

FT-111 controller supports a Modbus RTU interface over RS485, RS422 or RS232C serial port. This interface can be programmable to High-Low or Low-High for different type of PLC's. You can find below the difference of these data formats and some companies using these formats. Two types are available as;

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

Modbus RTU Data Structure

After programming RS485, RS422 or 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**). Functions code '0x03' (Read Holding Registers), '0x06' (Single Write Register), '0x17' (Read/Write Multiple Registers) and '0x10' (Preset Multiple Registers) are supported.

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

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

Parameter's 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

Make the RS485 / RS422 / RS232C parameter settings as defined on **Page 43, 44, 42**.

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. Functions 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 to the registers in big-endian format. Least significant word is stored to the highest register address; and most significant word is stored to the lowest register address.

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

Make the Ethernet parameter settings as defined on sub-block *15-*.

8.6.1 Modbus Command Table;

Address	R/W	Word	Command		Definition	
40001	R	2	Actual weight (Net if the indication is in Net, Peak value or Hold value)			
40003	R/W	2	Tare weight			
40005	R	2	Gross weight			
40007	R	2	Status	Bit	Definition	
				B0	0 – Dynamic is inactive	1 – Dyn weight is calculating
				B1	0 – Weight is actual w.	1 – Weight is dynamic result
				B2	0 – Weight is Stable	1 – Weight is unstable
				B3	0 – Gross mode	1 – Net mode
				B4	Not used	
				B5	0 – Not power on zeroed	1 – Zeroed with pwr on zero
				B6	0 – First Unit (power on)	1 – Second Unit
				B7-B10	Not used	
				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	0 – Basic Peak is passive	1 – Basic Peak is active
				B15	0 – Hold is passive	1 – Hold is active
				B16-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	0 – None	1 – Decimal point is X.X
				B31	0 – None	1 – No decimal point
40009	R	2	Error Status	Bit	Definition	
				B0	0 – No Error	1 – Low voltage det.
				B1	0 – No Error	1 – In programming mode
				B2	0 – No Error	1 – System error
				B3	0 – No Error	1 – ADC under range
				B4	0 – No Error	1 – ADC over range
				B5	0 – No Error	1 – ADC out of range
				B6	0 – No Error	1 – Tilt Switch is active
				B7– B31	Not used	
40011	R	2	Heartbeat for connection checking, this value is increased every 100 milliseconds.			
40013	R	2	Last print value			
40015	R/W	2	CN (Label number)		Refer to parameter [254] on page 54	
40017-24	R	8				
40025	R/W	2	Commands	Dec	Definition	
				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
				14-23	Not used
				24	Basic peak enable
				25	Basic peak disable
				26	Hold enable
				27	Hold disable
40027	R	2	Commands status	0	None
				1	Command is processing...
				2	Command is successfully.
				3	Command failed.
40029	R/W	12	Reserve		
40041	R	2	Status of Inputs	Bit	Definition
				B0	Input-1
				B1	Input-2
				B2	Input-3
				B3	Input-4
					0 – Passive 1 – Active
40043	R/W	2	Status of Outputs	B0	Output-1
				B1	Output-2
				B2	Output-3
				B3	Output-4
				B4	Output-5
					0 – Passive 1 – Active
40045	R/W	2	Setpoint 1 (High)		
40047	R/W	2	Setpoint 2 (High)		
40049	R/W	2	Setpoint 3 (High)		
40051	R/W	2	Setpoint 4 (High)		
40053	R/W	2	Setpoint 5 (High)		
40055	R/W	2	Not used		
40057	R/W	2	Setpoint 1Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.	
40059	R/W	2	Setpoint 2Low		
40061	R/W	2	Setpoint 3Low		
40063	R/W	2	Setpoint 4Low		
40065	R/W	2	Setpoint 5Low		
40127	R/W	2	Dynamic filter	Refer to parameter [332] on page 55	
40129	R/W	2	Digital filter	Dec	Description
				0	No
				1	Very Low
				2	Low
				3	Medium
				4	High
				5	Very High

40131	R/W	2	Power on zero	0	Disable
				1	± 2%
				2	± 2%LK
				3	± %10
				4	+ %15, - %5
				5	± %20
40133	R/W	2	Zeroing Range	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
40139	R/W	2	Stability Detection Range	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 59	
40143	R/W	10	Reserve		
40153	R/W	2	Unit	Dec	Description
				0	g (Gram)
				1	kg (Kilogram)
				2	t (Ton)
				3	lb (Libre)
				4	No unit (without unit)
				5	N (Newton)
				6	kN (Kilonewton)
				7	kLb (Kilolibre)
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 59	
40159	R/W	2	Decimal point-1	Dec	Description
				0	XXXXOO
				1	XXXXXO
				2	XXXXXX
				3	XXXXX.X
				4	XXXX.XX
				5	XXX.XXX
40161	R/W	2	Increment-1	Dec	Description
				0	X 1

				1	X 2
				2	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	Dec	Description
				0	Over indication after Max.
				1	1 division more than Max.
				2	5 division more than Max.
				3	9 division more than Max.
				4	2% more than Max.
				5	5% more than Max.
40177	R/W	2	Tare type	0	Subtractive tare
				1	Additive tare
40179	R/W	2	Maximum tare	Refer to par. [526] page 59	
40181	R/W	2	Secondary unit	Dec	Description
				0	g (Gram
				1	kg (Kilogram)
				2	t (Ton)
				3	lb (Libre)
				4	No unit (without unit)
				5	N (Newton)
				6	kN (Kilonewton)
				7	kLb (Kilolibre)
40183	R/W	2	Reserve		
40185	R/W	2	Calibration Commands	Decimal	**Definition**
				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		eCal Coefficients
40191	R/W	2	Average mV/V value for eCal		
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 calibrating - Check load cell cable - Re-energize the instrument
				B6	Instrument cannot be calibrating - Load cell signal is very low or too high
				B7	Calibration Error - Calibration loading is not enough - Check test weight loading - Check load cell connections
				B8	Calibration load value entry Error - Test weight is too small. Increase the weight
				B9	Scale unstable - Wait until scale become stable - Check grounding wiring
				B10	The Calibration switch is not '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.	
40209	R	2	Load cell millivolt value (only FT-111)	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.	

Programming steps of frequent used commands:

Reading weight value:

1. Read 40009 and 40010.
2. Check error status,
3. If there isn't any error, read the weight value (gross, net or tare),
4. If there is an error, check the error code.

Zero Calibration procedure:

1. Check the bit B0 of 40195 which should be '1' to start adjustment.
2. Load the decimal '188' to 40185 to start Zero calibration.
3. Check the bit B1 of 40195 which is '1' during zero calibration process.
4. The bit B0 of 40195 changes to '1' at the end of the Zero calibration.
5. If one of error bits (B3 ~ B10) of 40195 is '1', check error code to understand the calibration error.

Span Calibration procedure:

1. Check the bit B0 of 40195. it should be '1' to start adjustment.
2. First load the span value to 40187-188 and then load the decimal '220' to 40185 to start Span calibration.
3. Check the bit B2 of 40195 which is '1' during span calibration process.
4. The bit B0 of 40195 changes to '1' at the end of the Span calibration.
5. If one of error bits (B3 ~ B10) of 40195 is '1', check error code to understand 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 RTU High-Low) to hex system with the instrument set to address "0x01".

Below you will find some command samples;

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,B8,00,06,0C,00,00,00,EC,00,00,00,00,00,01,86,A0,D7,B9
Average mV/V Command with Average mV/V value 1.9999	01,10,00,B8,00,08,10,00,00,00,FA,00,00,00,00,00,00,00,00,00,00,4E,1F,8E,3D
Dead load Command with Dead load value 12345	01,10,00,B8,00,0A,14,00,00,00,AB,00,00,00,00,00,00,00,00,00,00,00,00,00,30,39,7F,06
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,F0
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

8.7 Ethernet TCP/IP

***IMPORTANT NOTE**: Modbus RTU and Modbus TCP interfaces require Modbus SD card at the SD2 card slot on the rear of the instrument.*

Ethernet output of FT-111 is programmable to 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, as shown in the table below, are described in the related sections.

Data Format	Description
BSI Command set	Refer to **Page *91***.
Continuous	Refer to **Page 83, 84**.
Fast Continuous	Refer to **Page 84**.
Modbus TCP High-Low	Modbus TCP interfacing. Refer to **Page 95**.
Modbus TCP Low-High	Modbus TCP interfacing. Refer to **Page 95**.

Table 8-1 - Ethernet output interfacing

You can communicate with FT-111 after programming Ethernet TCP/IP and Modbus TCP related parameters [15-].

8.7.1 Ethernet Parameters

Ethernet parameters can be adjusted by keys in programming mode. Refer to parameter block [15-]. Additionally, Ethernet parameters set up is done by Indface2x PC software over Local Network Area or by Flintec´s set up PC software. Both software are available on www.flintec.com

Parameters	Descriptions
Host Name	Device name of the instrument. Refer to parameter 255.
IP Address	Obtain IP address manually. Refer to parameter 152.
Local Port	Ethernet connection port of the instrument. Refer to parameter 156.
Gateway	Network point that acts as an entrance to another network. Refer to parameter 155.
Subnet Mask	Describes IP address can be used in network. Refer to parameter 154.
Primary DNS	Obtain primary DNS manually. Refer to parameter 159.
Secondary DNS	Obtain secondary DNS manually.
Remote Connection Check Box	Automatic connection to any device on the network. Refer to parameter 15E and 15F. 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 123456.
Set Defaults	Sets factory defaults.

Note: For Modbus TCP/IP Data Structure see Table on **Page 96.**

9 OPTIONAL COMMUNICATION

9.1 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-111 has analogue output, which is programmable to 4 – 20 mA, 0 – 20 mA, 0 – 5 V or 0 – 10 V. 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 with 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 increase 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 any error indication on the display.

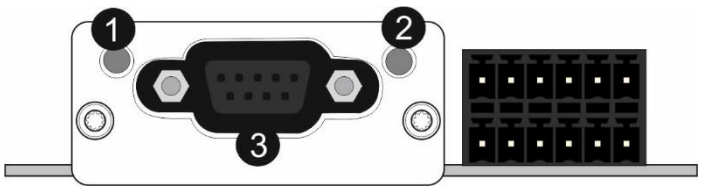
Condition (On Display)	4-20 mA output	0-20 mA output	0 – 5 V output	0 – 10 V output
The weight is more than the range (⌜------⌝)	24 mA	24 mA	5.5 V	11 V
The weight is under the zero range (⌞_____⌟)	0 mA	0 mA	-4.0 V	-4.0 V
Error [Err XX]	24 mA	24 mA	5.5 V	11 V
ADC is out of operating range (LC Err)	24 mA	24 mA	5.5 V	11 V

The error data indicated above can be used to follow the errors at PLC.

9.2 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. Refer to Profibus parameters, sub-block 19-,
GSD file is available on internet www.flintec.com.

There are two LEDs near the Profibus connector;



1	(A) Operation mode LED
2	(B) Status LED
3	Profibus Connector

(A) Operation mode LED

State	Indication	Comment
Off	Not online /No power	Check power and cable
Green	On-line, data exchange	-
Flashing Green	On-line, clear	-
Flashing Red (2 flash)	PROFIBUS configuration error	Check GSD file configuration.

(B) Status LED

State	Indication	Comment
Off	Not power or not initialized	No power or Profibus module is in initialization state
Green	Initialized	
Flashing Green	Initialized, diagnostic event(s) present	Diagnostic is active
Red	Exception error	There is an exception error

9.2.1 Data Format

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

9.2.2 GSD Configuration

Profibus data consist of 2 x Input-2 words and 2 x Output-2 words.

The **GSD file** is available on internet www.flintec.com..

GSD configuration for PLC programmers is shown in Figure 9.1.

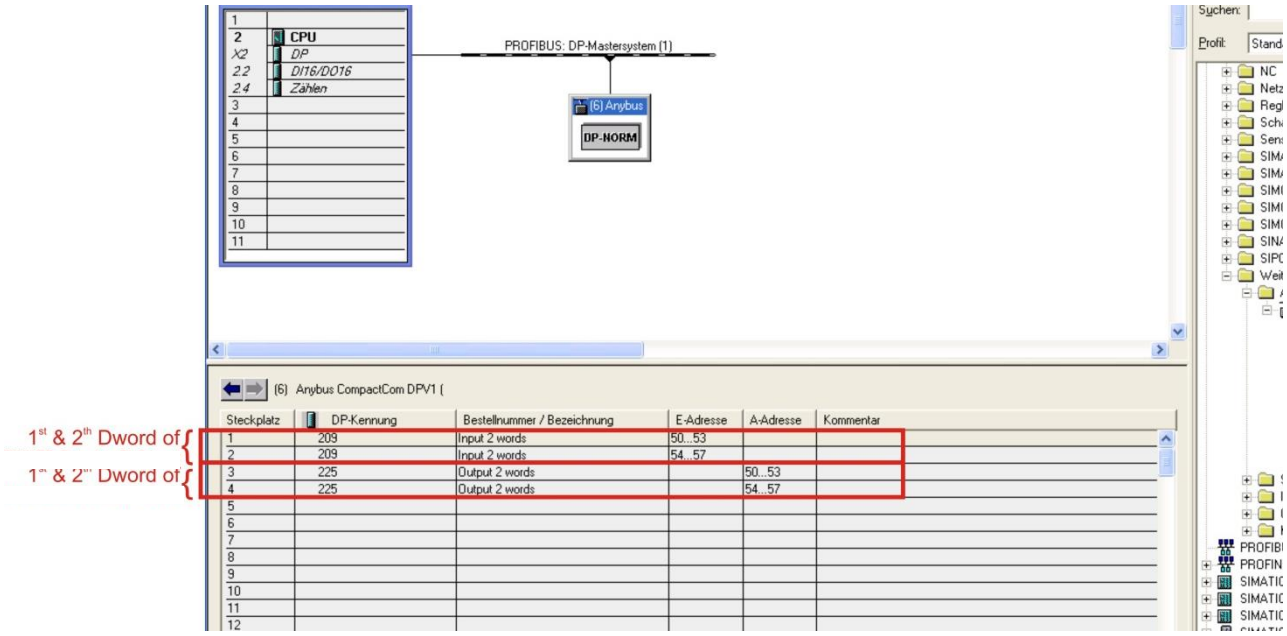


Figure 9.1 - GSD Configuration

GSD Configuration	Description
Input 2 words	1st Dword (FT-111 Output to PLC Input)
Input 2 words	2nd Dword (FT-111 Output to PLC Input)
Output 2 words	1st Dword (PLC Output to FT-111 Input)
Output 2 words	2nd Dword (PLC Output to FT-111 Input)

9.2.3 Profibus DP Data Structure

For the Data Structure for Profibus see Appendix 1, **page 122**

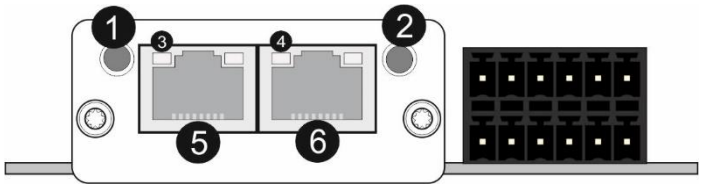
9.3 Profinet

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

1. Serial bus connection. You may connect instruments serial to your Profinet 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. You may change the port, if there is any malfunction on port in usage.

The Profinet interface is 100Mbit and full duplex.
GSDML file for two port Profinet is available on internet www.flintec.com.

There are 4 announcement LEDs on the instrument to indicate the interface status as seen below. The meanings of these LED's are;



1	(A) Network Status LED
2	(B) Module Status LED
3	Link/Activity LED (port 1)
4	Link/Activity LED (port 2)
5	P1 interface (port 1)
6	P2 interface (port 2)

(A) Network Status LED

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

(B) Module Status LED

LED State	Description	Comment
Off	Not power or not initialized	No power or Profinet module is in initialization state
Green	Normal operation	
Green, 1 flash	Initialized, diagnostic event(s) present	Diagnostic is active
Red	Exception error	There is an exception error
Red, 1 flash	Configuration Error	Check GSDML configuration
Red, 2 flashes	IP Address Error	IP address not set
Red, 3 flashes	Device Name Error	Device name not set
Red, 4 flashes	Internal Module Error	Re-energize the instrument. If seen again, change the board.

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

LED State	Description	Comment
Off	No Link	No link, no communication present

Green	Link	Ethernet link established, no communication present
Green, flickering	Activity	Ethernet link established, communication present

9.3.1 Data Format

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

9.3.2 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 Indface2x PC software over Local Network Area or by Flintec set up PC software. Both software are available on www.flintec.com.

Note: *Station name is 'scale-1' as a default.*

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

9.3.3 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 9.3.

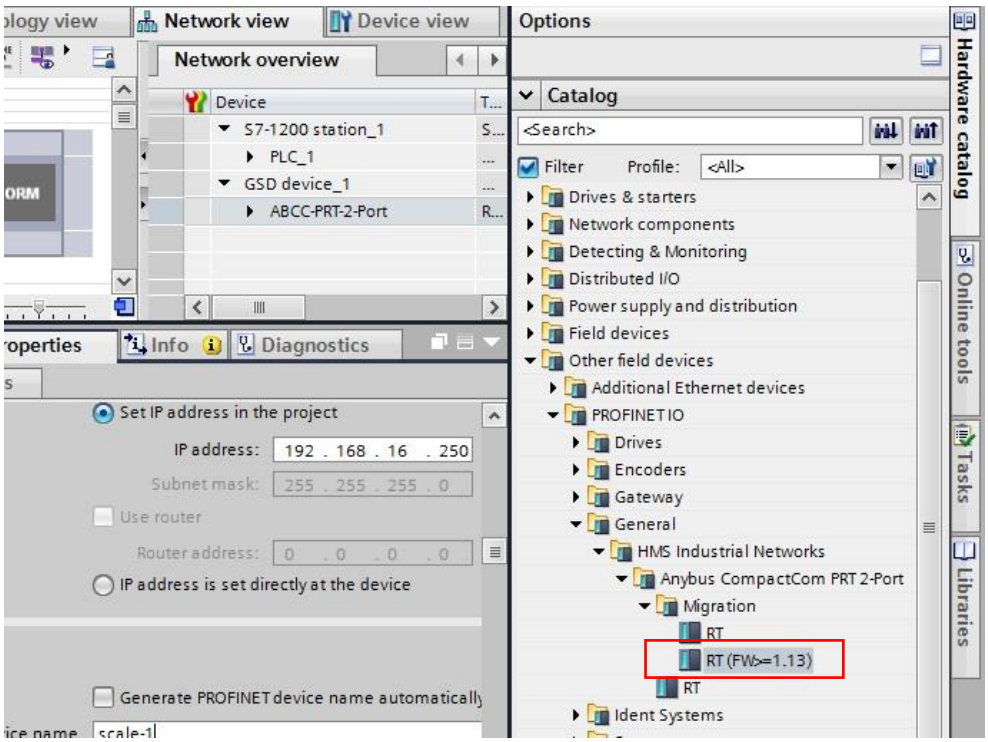


Figure 9.2 – Location of Hardware catalog

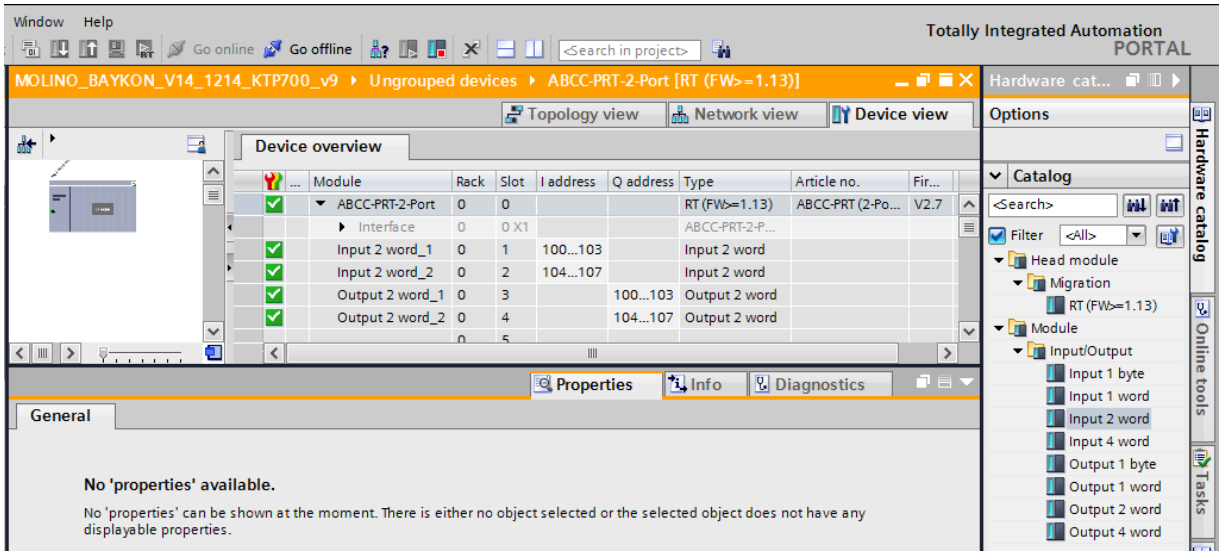


Figure 9.3 - GSDML Configuration

GSDML Configuration	Description
Input 2 word_1	1st Dword (FT-111 Output to PLC Input)
Input 2 word_2	2nd Dword (FT-111 Output to PLC Input)
Output 2 word_1	1st Dword (PLC Output to FT-111 Input)
Output 2 word_2	2nd Dword (PLC Output to FT-111 Input)

9.3.4 Profinet Data Structure

For the Data Structure for Profinet see Appendix 1, **page 122**

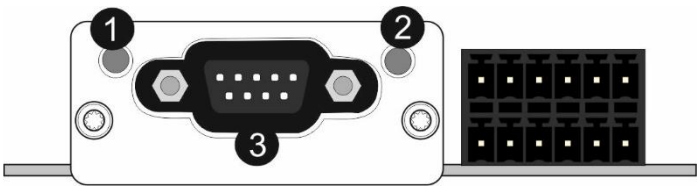
9.5 CANopen

After setting related parameters you can communicate with FT-111 via CANopen network.

EDS file is available on internet 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 LED's near the CANopen connector which are;



1	(A) RUN LED
2	(B) ERROR LED
3	CANopen interface

(A) 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 hardware damages
Green, flickering	Auto baudrate detection in progress	-
Red	CANopen configuration error	Check EDS file

(B) 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 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.

9.5.1 Data Format

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

9.5.2 EDS Configuration

CANopen data structures consist of TxPDO (64 bit) and RxPDO (64 bit). EDS configuration for PLC programmers is shown in Figure 9.4.

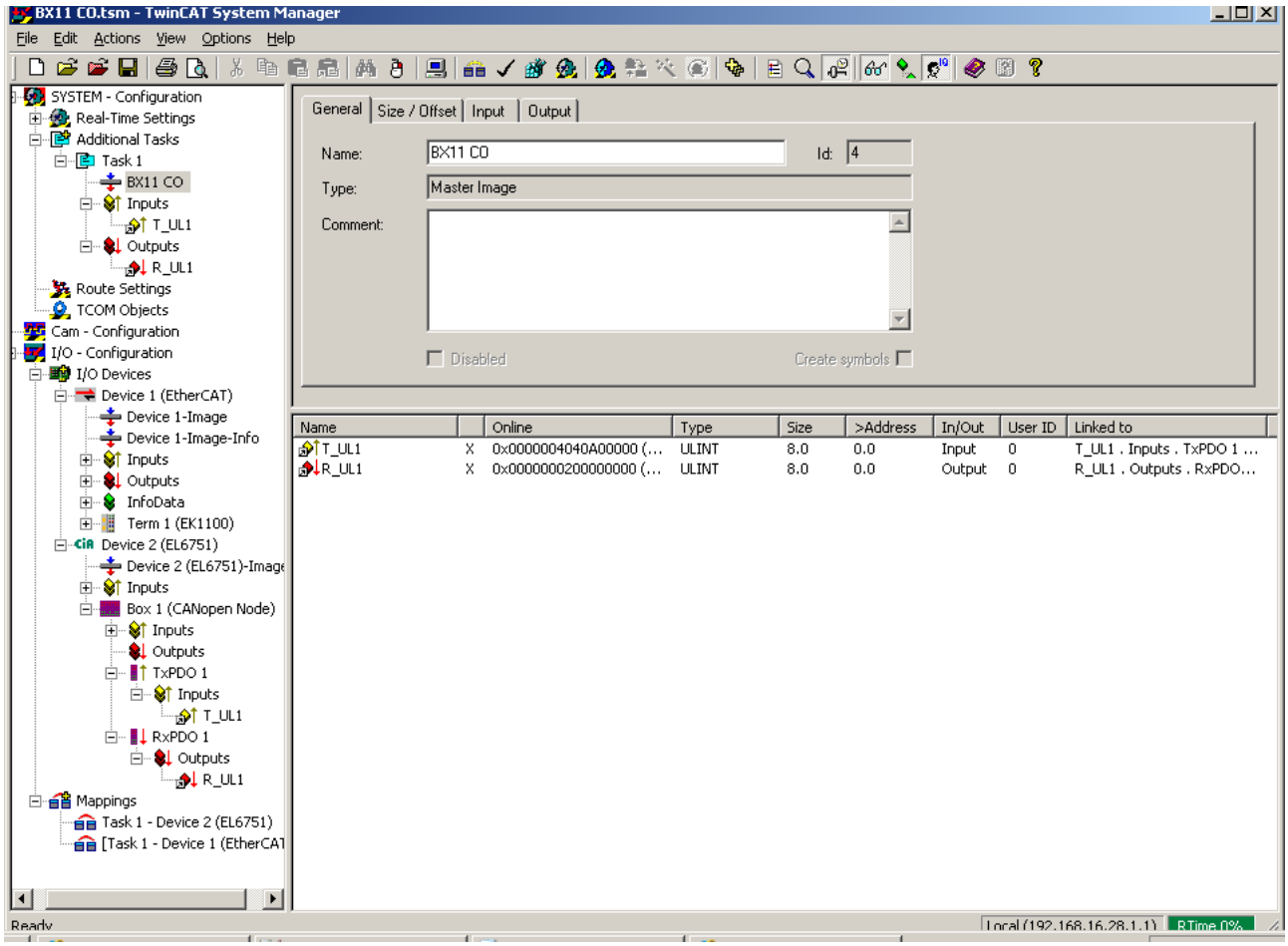


Figure 9.4 - EDS Configuration

EDS Configuration	Description
TxPDO 1 (4 words	Unsigned Long (FT-111 Output to PLC Input)
RxPDO 1 (4 words)	Unsigned Long (PLC Output to FT-111 Input)

9.5.3 CANopen Date Structure

For the Data Structure for CANopen see Appendix 2, **page 131**

9.6 EtherNet/IP

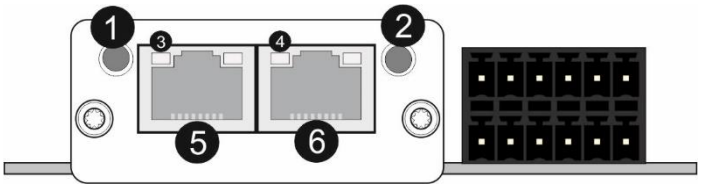
EtherNet/IP interface of the instrument can be done via hub switch or serial bus over two EtherNet/IP port.

1. Serial bus connection of instruments. You may connect instruments serial to your EtherNet/IP 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. 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.

EDS file for two port EtherNet/IP is available on internet www.flintec.com

There are 4 announcement LEDs on the instrument to indicate the interface status as seen below.



1	(A) Network Status LED
2	(B) Module Status LED
3	Link/Activity LED (port 1)
4	Link/Activity LED (port 2)
5	P1 interface (port 1)
6	P2 interface (port 2)

(A) Network Status LED

LED State	Description
Off	No IP address
Green	Online, one or more connections established (CIP Class 1 or 3)
Green, flashing	Online, no connections established
Red	Duplicate IP address, FATAL error
Red, flashing	One or more connections timed out (CIP Class 1 or 3)

(B) Module Status LED

LED State	Description
Off	No power
Green	Controlled by a scanner in run state
Green, flashing	Not configured, or scanner in idle state
Red	Major fault (EXCEPTION state, FATAL error etc.)
Red, flashing	Recoverable fault(s)

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

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)

9.6.1 Data Format

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

9.6.2 EtherNet/IP Parameters

EtherNet/IP parameters can be adjusted by keys in programming mode. Refer to parameter block [19-]. Additionally, EtherNet/IP parameters set up are done by EtherX PC software over Local Network Area or by Flintec set up PC software. Both software are available on 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 parameter 192.
Gateway	If DHCP is disabled, obtain default gateway manually. Refer to parameter 195.
Subnet Mask	If DHCP is disabled, obtain subnet mask manually. Refer to parameter 194.
Primary DNS	If DHCP is disabled, obtain primary DNS manually.
Secondary DNS	If DHCP is disabled, obtain secondary DNS manually.
Password	**Default password is 123456**.

9.6.3 EDS Configuration

EtherNet/IP data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. EDS configuration for PLC programmers is shown in Figure 9.5 and Figure 9.6.

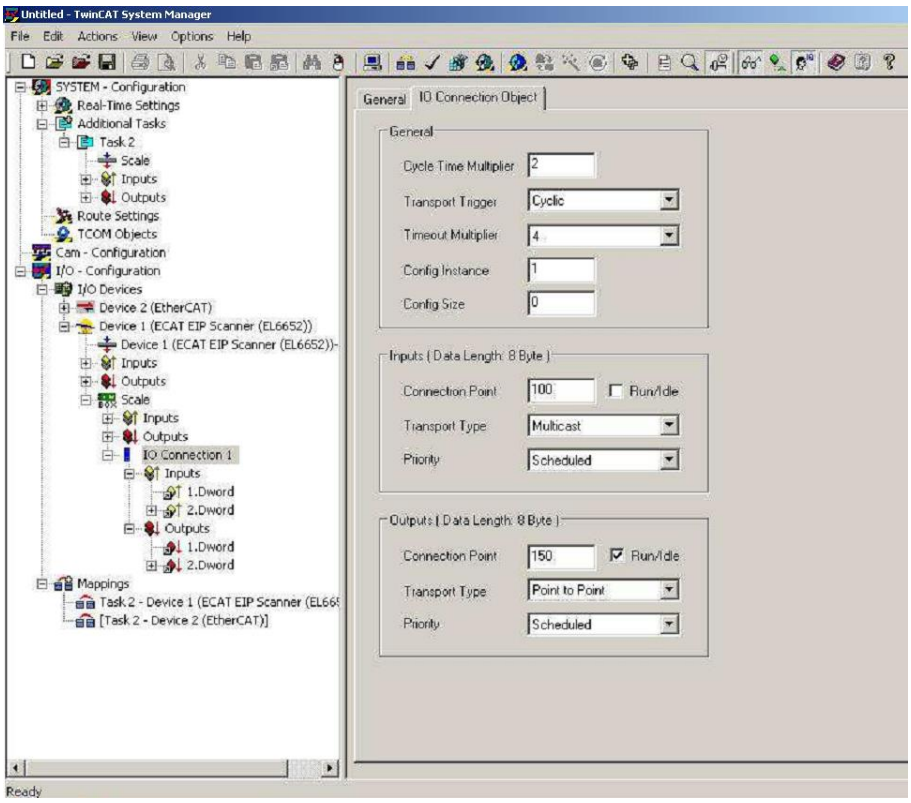


Figure 9.5 – Configuration of module properties without EDS file

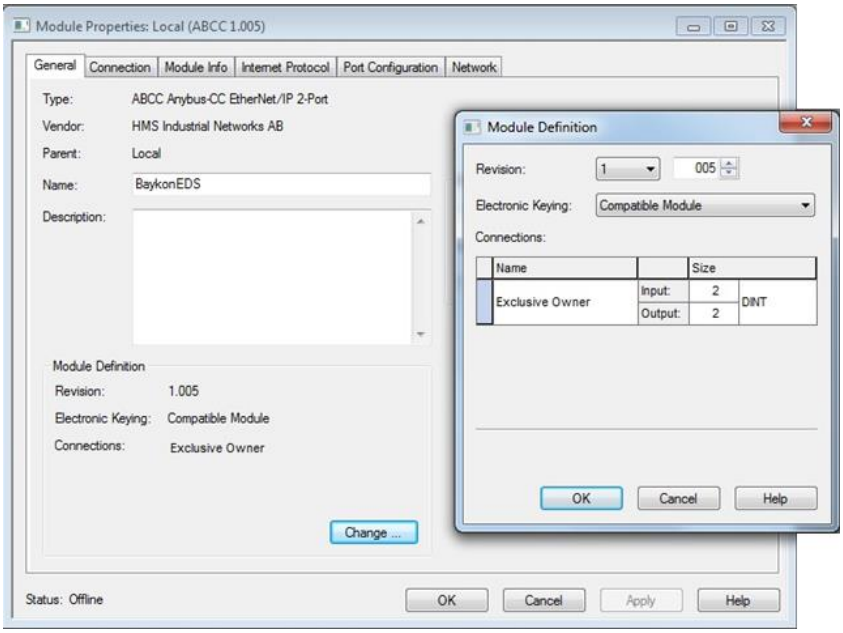


Figure 9.6 – Configuration of module properties with EDS file

Data Length	Description
Input 2 words	1st Dword (FT-111 Output to PLC Input)
Input 2 words	2nd Dword (FT-111 Output to PLC Input
Output 2 words	1st Dword (PLC Output to FT-111 Input)
Output 2 words	2nd Dword (PLC Output to FT-111 Input

9.6.4 EtherNet/IP Data Structure

For the Data Structure for EtherNET/IP see Appendix 1, **page 122**

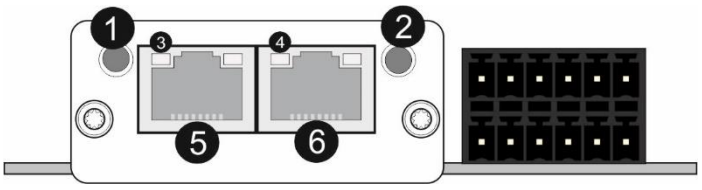
9.7 EtherCAT

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

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.

ESI file for two port EtherCAT is available on internet www.flintec.com.

There are 4 announcement LEDs on the instrument to indicate the interface status as seen below. The meanings of these LED's are;



1	(A) RUN LED
2	(B) ERR LED
3	Link/Activity (IN port) Led
4	Link/Activity (OUT port) Led
5	EtherCAT (IN port)
6	EtherCAT (OUT port)

(A) RUN LED

LED State	Description
Off	INIT
Green	OPERATIONAL
Green, blinking	PRE-OPERATIONAL
Green, single flash	SAFE-OPERATIONAL
Red	(Fatal Event)

(B) ERR LED

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

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

LINK/Activity LED

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

9.7.1 Data Format

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

9.7.2 ESI Configuration

EtherCAT data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. ESI configuration for PLC programmers is shown in Figure 9.7.

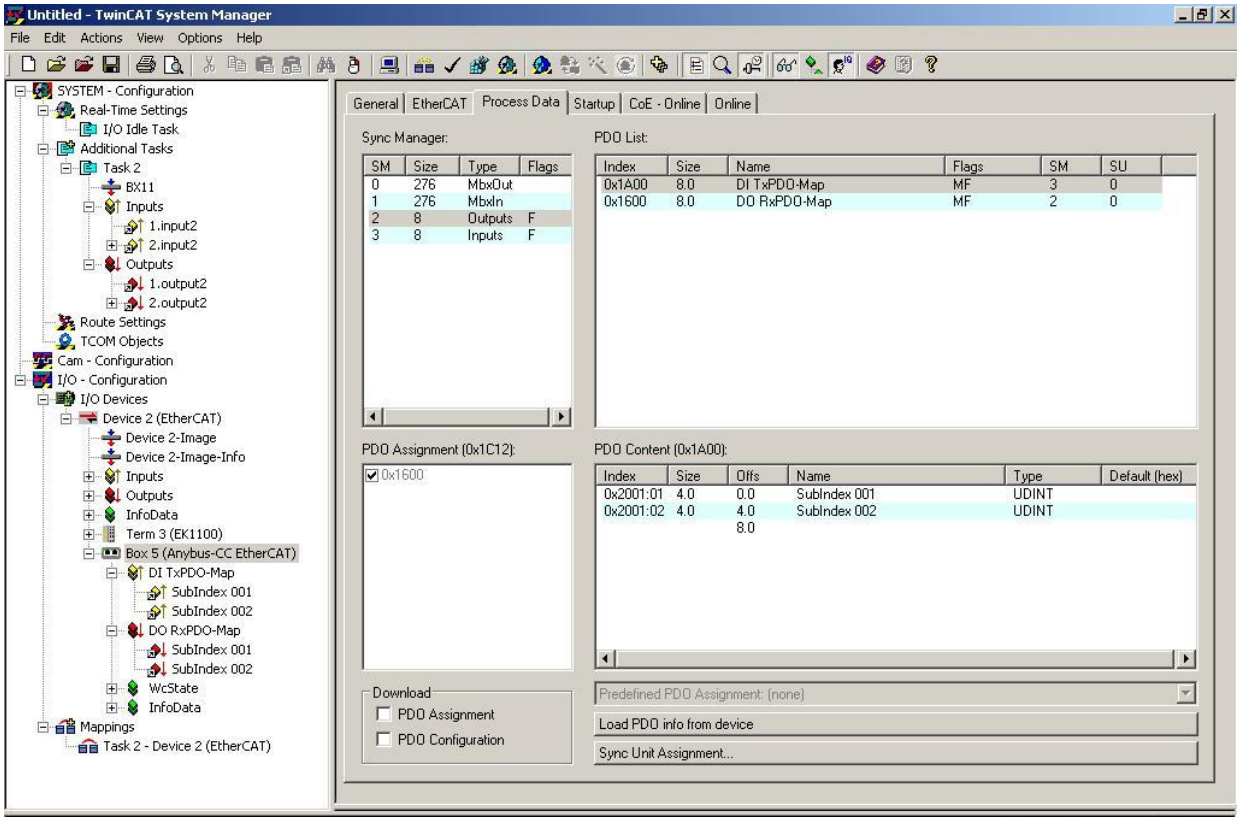


Figure 9.7 – Configuration of module properties for Beckhoff

Input/Output	Definition	Description
DI TxPDO-Map	SubIndex 001	1st Dword (*FT-111Output to PLC Input*)
	SubIndex 002	2nd Dword (*FT-111 Output to PLC Input*)
DO RxPDO-Map	SubIndex 001	1st Dword (*PLC Output to FT-111 Input*)
	SubIndex 002	2nd Dword (*PLC Output to FT-111 Input*)

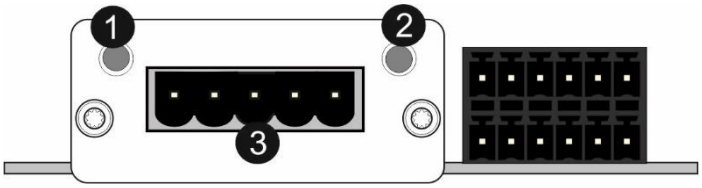
9.7.3 EtherCAT Data Structure

For the Data Structure for EtherCAT see Appendix 1, **page 122**

9.8 CC-Link

After setting related parameters you can communicate with FT-111 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 2 LED's near the CC-Link connector which are;



1	(A) RUN LED
2	(B) ERR LED
3	CC-Link interface

(A) Run LED

State	Indication
Off	No network participation, timeout status (no power)
Green	Participating, normal operation
Red	Major fault (FATAL error)

(B) Error LED

State	Indication
Off	No error detected (no power)
Red	Major fault (Exception or FATAL event)
Red, flickering	CRC error (temporary flickering)
Red, 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.

9.8.1 Data Format

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

9.8.2 CC-Link Configuration

The weighing indicator has occupied one station area on CC-Link network and station type of weighing indicator must be programmed as 'Remote device station' in the PLC software. CC-Link configuration for PLC programmers is shown in Figure 9.8.

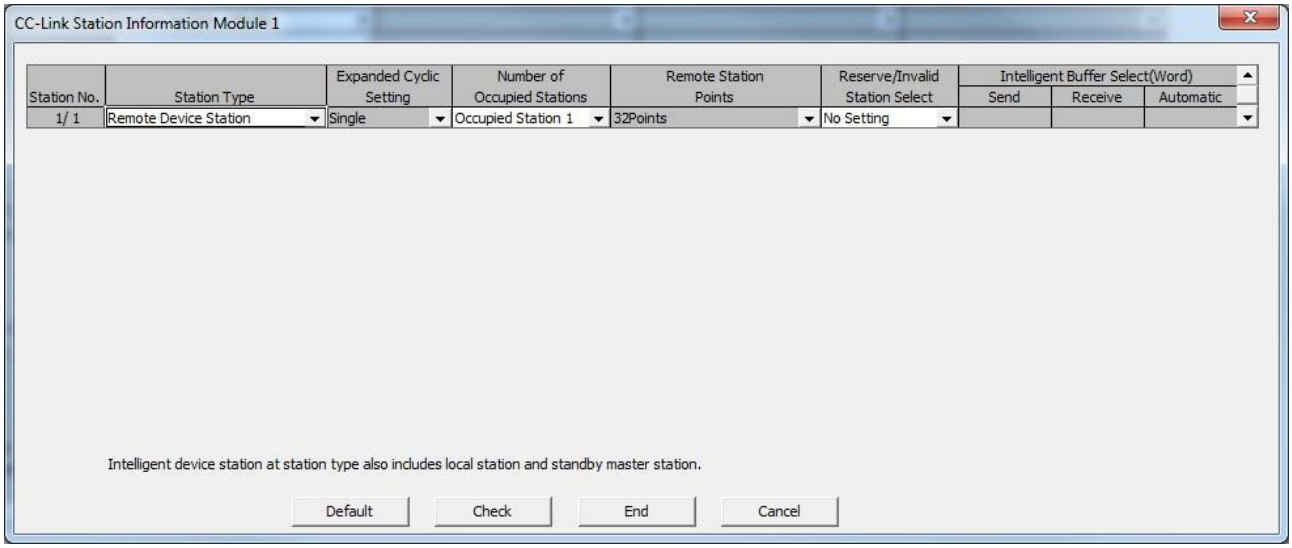


Figure 9.8 – Station information

Input/Output	Definition	Description
Remote Register (RWr)	RWr0, RWr1	1st Dword Input (*FT-111 Output to PLC Input*)
	RWr2, RWr3	2nd Dword Input (*FT-111 Output to PLC Input*)
Remote Input (RX)	RX0 ~ RX31	Not used
Remote Register (RWw)	RWw0, RWw1	1st Dword Output (*PLC Output to FT-111 Input*)
	RWw2, RWw3	2nd Dword Output (*PLC Output to FT-111 Input*)
Remote Output (RY)	RY0 ~ RY31	Not used

9.8.3 CC-Link Data Structure

For the Data Structure for CC-Link see Appendix 1, **page 122**

9.9 Powerlink

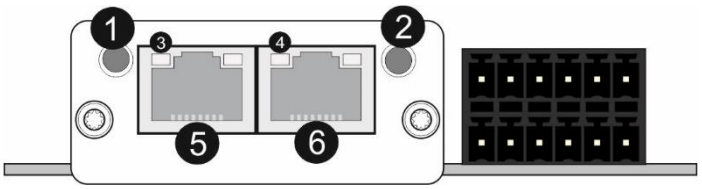
Powerlink interface of the weighing instrument can be done via hub switch or serial bus over two Powerlink port.

1. Serial bus connection of instruments. You may connect instruments serial 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. You may change the port, if there is any malfunction on port in usage.

The Powerlink interface is 100Mbit and half duplex.

Powerlink is available on internet www.flintec.com.

There are 4 announcement LEDs on the instrument to indicate the interface status as seen below. The meanings of these LED's are;



1	(A) Status LED
2	(B) Error LED
3	Link/Activity LED (port 1)
4	Link/Activity LED (port 2)
5	P1 interface (port 1)
6	P2 interface (port 2)

(A) Status LED

LED State	Description
Off	Module is off, initializing, or not active.
Green, fast flashing[a]	NMT_CS_BASIC_ETHERNET Basic Ethernet state: no POWERLINK traffic has been detected.
Green, single flash	NMT_CS_PRE_OPERATIONAL_1. Only asynchronous data.
Green, double flash	NMT_CS_PRE_OPERATIONAL_2. Asynchronous and synchronous data. No PDO data.[b]
Green, triple flash	NMT_CS_READY_TO_OPERATE. Ready to operate. Asynchronous and synchronous data. No PDO data.[b]
Green	NMT_CS_OPERATIONAL. Fully operational. Asynchronous and synchronous data. PDO data is sent and received.
Green, slow flashing[c]	NMT_CS_STOPPED Module stopped (for controlled shutdown, for example). Asynchronous and synchronous data. No PDO data.[b]
Red	If the ERROR LED also is red, a fatal event was encountered.

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.

(B) Error LED

LED State	Description
Off	No error
Red	If the STATUS LED is not red, a non-fatal error has been detected. If the STATUS LED is red, a fatal event was encountered.

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

LINK/Activity LED

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

9.9.1 Data Format

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

9.9.2 XDD Configuration

Powerlink data structures consist of 2 pcs Input-2 words and 2 pcs Output-2 words. **XDD configuration** for PLC programmers is shown in Figure 9.9.

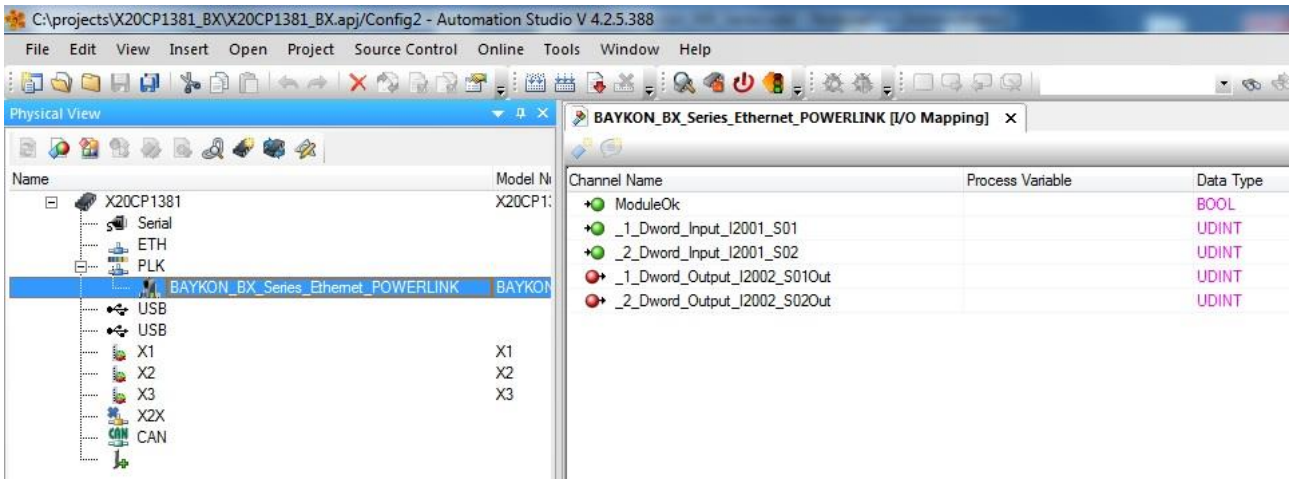


Figure 9.9 – Configuration of module properties with XDD file

Data Length	Description
1_Dword_Input_I2001_S01	1st Dword (FT-111 Output to PLC Input
2_Dword_Input_I2001_S02	2nd Dword (FT-111 Output to PLC Input)
1_Dword_Output_I2002_S01Out	1st Dword (PLC Output to FT-111 Input)
2_Dword_Output_I2002_S02Out	2nd Dword (PLC Output to FT-111 Input)

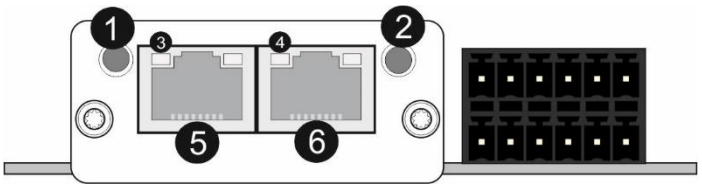
9.9.3 Powerlink Data Structure

For the Data Structure for Powerlink see Appendix 1, **page 122**

9.10 CC-Link IE Field

After setting related parameters you can communicate with FT-111 via CC-Link network.

There are 2 LED's near the CC-Link connector which are;



1	(A) NS/RUN LED
2	(B) AS/ERROR LED
3	Link/Activity LED (port 1)
4	Link/Activity LED (port 2)
5	P1 interface (port 1)
6	P2 interface (port 2)

(A) NS/RUN LED

State	Indication
Off	No power Operation abnormal
Green	Operation normal
Red	Fatal Event *If NS/RUN and AS/ERR turn red, this indicates a fatal event.*

(B) AS/ERROR LED

State	Indication
Off	No error detected (or no power)
Red	Error *An error occurred in the device. If NS/RUN is off, the device enters state EXCEPTION. If NS/RUN and AS/ERR turn red, this indicates a fatal event.*

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

9.10.1 Data Format

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

9.10.2 CC-Link IE Configuration

The weighing indicator has occupied one station area on CC-Link network and station type of weighing indicator must be programmed as 'Remote device station' in the PLC software. CC-Link configuration for PLC programmers is shown in Figure 9.8.

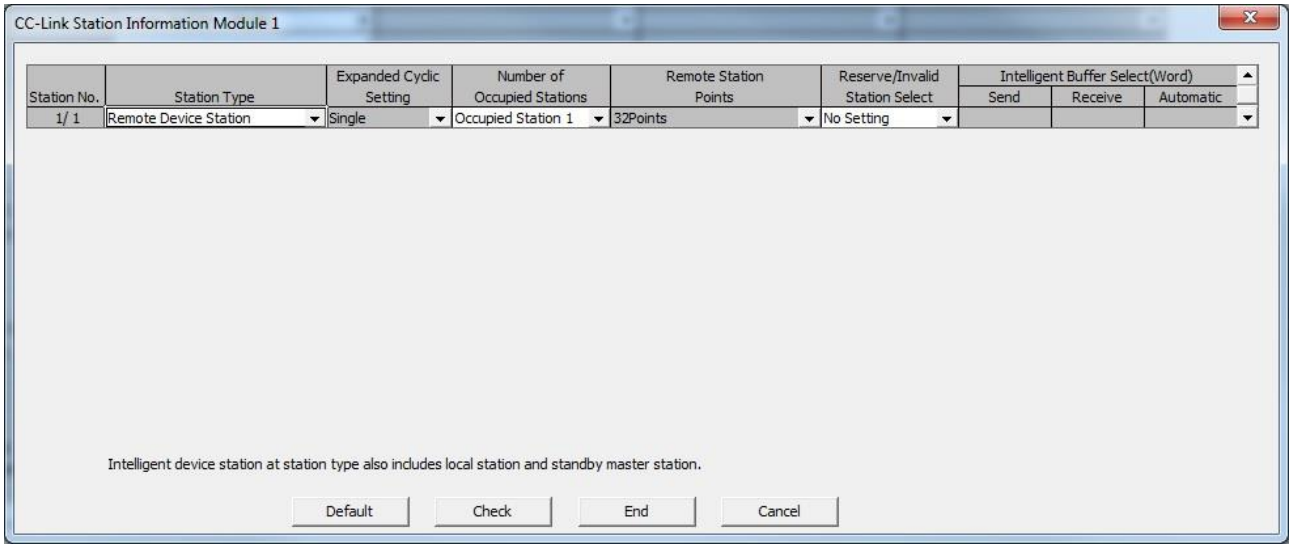


Figure 9.10 – Station information

Input/Output	Definition	Description
Remote Register (RWr)	RWr0, RWr1	1st Dword Input (*FT-111 Output to PLC Input)*
	RWr2, RWr3	2nd Dword Input (*FT-111 Output to PLC Input*)
Remote Input (RX)	RX0 ~ RX31	Not used
Remote Register (RWw)	RWw0, RWw1	1st Dword Output (*PLC Output to FT-111 Input*)
	RWw2, RWw3	2nd Dword Output (*PLC Output to FT-111 Input*)
Remote Output (RY)	RY0 ~ RY31	Not used

9.10.3 CC-Link IE Data Structure

For the Data Structure for CC-Link IE see Appendix 1, **page 122**

10 APPENDIX 1: DATA STRUCTURE PROFIBUS, PROFINET, ETHERNET/IP, ETHERCAT, CC-LINK, POWERLINK, CC-LINK IE

FT-111 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) (RWr0, RWr1)	By default, Actual weight value is represented. To represent other weight or calibration status, refer to next Dword.															
2nd Dword (INPUT) (RWr2, RWr3)				Out 5	Out 4	Out 3	Out 2	Out 1					In 4	In 3	In 2	In 1
	Error codes of FT-111				Unit			Centre of zero	Gross Net	SD	Read command response					Cmd Flg

FT-111 Output to PLC Input 2nd 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-111	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
		0111	7	Tilt Switch is active
B11	Unit	0		First unit
		1		Second unit
B9-B10	Not used			
B8	Centre of zero	0		Weight is out of zero range
		1		Weight is in zero range
B7	Indication	0		Gross
		1		Net
B6	Stability Detection	0		Stable
		1		Unstable
B5 ... B1	Read Command Response	Bin	Dec	Descriptions
		0000 0	0	Actual weight (if the indication is in Net)
		00001	1	Gross weight

		00010	2	Tare weight	
		00011	3	ALL Status (Refer to Table 10-1)	
		00100	4	Calibration Status (Refer to Table 10-2)	
		00101	5	Last print value	
		00110 01010	6 10	Not used	
		01011	11	CN (Label number)	
		01100 01110	12 14	Not used	
		01111	15	SetPoint-1 (High)	
		10000	16	SetPoint-2 (High)	
		10001	17	SetPoint-3 (High)	
		10010	18	SetPoint-4 (High)	
		10011	19	SetPoint-5 (High)	
		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Expanded Commands List (Refer to Table 10-3)	
B0	CMD Flag	Toggles		The command is applied successfully	

ALL Status (always 32 bit integer)

1st Dword (input) descriptions when read command is 'ALL Status'.

Refer to 2nd Dword of PLC Output to FT-111 Input.

Bit Number	1st Dword (input) Description		
B31	Place of decimal point	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 ... B16	Not in use		
B15	Hold status	0	Passive
		1	Active
B14	Basic Peak status	0	Passive
		1	Active
B13	High resolution status	0	Passive
		1	Active
B12	Centre of zero	0	Weight is out of zero range
		1	Weight is in zero range
B11	Key lock status	0	Passive
		1	Active
B7-B10	Not used		
B6	Unit indication	0	First Unit (power on unit)
		1	Second Unit
B5	Power On Zero	0	Not power on zeroed
		1	Zeroed with power on zero
B4	Not in use		
B3	Indication	0	Gross mode
		1	Net mode
B2	Motion Detection	0	Stable
		1	Unstable
B1	Actual Weight or Dynamic Result	0	Weight is actual weight
		1	Weight is dynamic result
B0	Dynamic Operation	0	Dynamic is inactive
		1	Dynamic weight is calculating

Table 10-1– ALL Status table

Calibration Status (always 32 bit integer)

1st Dword (input) descriptions when read command is 'Calibration Status'. Refer to 2nd Dword of PLC Output to FT-111 Input

Bit Number	1st Dword (input) Description	
B31 ... B11	Not in use	
B10	0	No Error
	1	The Calibration DIP switch is not 'On' position. - Check the calibration DIP switch.
B9	0	No Error
	1	Scale unstable - Wait until scale become 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 calibrating - Load cell signal is very low or too high
B5	0	No Error
	1	Instrument cannot be calibrating - 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 10-2 - Calibration status

PLC Output to FT-111 Input

Bitwise of a Dword:

Dword (R/W)	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) (RWr0, RWr1)	Next Dword defines the usage of this Dword.															
2nd Dword (OUTPUT) (RWr2, RWr3)				Out 5	Out 4	Out 3	Out 2	Out 1	Expanded Commands List							
	Not in use					Command List					Read Data Selection					New CMD

PLC Output to FT-111 Input 2nd Dword

Bit Number	**2nd Dword descriptions**				
B31... B24	Set / Reset digital outputs				
B23... B16	Expanded Commands List (Refer to Table 10-3)				
B15... B11	Not in use				
B10 ... B6	Command List	Bin	**Dec**	Commands	
		00000	0	None 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 (1)	
		00111	7	Total Load Cell Capacity (1)	eCal Coefficients Refer to par. [613]
		01000	8	Average mV/V value (1)	
		01001	9	Dead Load value (1)	
		01010	10	Save the coefficients of eCal	
		01011	11	CN (Label number) (1)	
		01100 01110	12 14	Not used	
		01111	15	SetPoint-1 (High)	
		10000	16	SetPoint-2 (High)	
		10001	17	SetPoint-3 (High)	
		10010	18	SetPoint-4 (High)	
		10011	19	SetPoint-5 (High)	

		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Use the Expanded Command list (Refer to Table 10-3)	
B5 ... B1	Read Data Selection	00000	0	Actual weight (if the indication is in Net)	
		00001	1	Gross weight	
		00010	2	Tare weight	
		00011	3	ALL Status (Refer to Table 10-1)	
		00100	4	Calibration Status (Refer to Table 10-2)	
		00101	5	Last print value	
		00110 01010	6 10	Not used	
		01011	11	CN (Label number)	
		01100 01110	12 14	Not used	
		01111	15	SetPoint-1 (High)	
		10000	16	SetPoint-2 (High)	
		10001	17	SetPoint-3 (High)	
		10010	18	SetPoint-4 (High)	
		10011	19	SetPoint-5 (High)	
		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Use the Expanded Command list (Refer to Table 10-3)	
B0	New CMD	Toggle		Apply commands which are listed in this table.	

(1) Write this command after writing values to 1st Dword, then apply this command with New CMD

Expanded Command List

Here 1st Dword (Input) is the data receiving from PLC and the "B23 ... B16" bits describe below.

Bit No	Description						
B23...B16	Expanded Commands List	Bin	Dec	Commands			
		00000000	0	R	Voltage of power supply(2) The value is indicated with 0.1 VDC increment for DC variant.		
		00000001	1	R	Load cell millivolt value(2) (Only FT-111) Millivolt of active scale is indicated with 0.01 mV increment.		
		00000010	2	R	Command status(2)	Dec	**Descr. of 1st Dword**
						0	None
						1	Command is processing
						2	Command is done
						3	Command failed
		00000011	3	R/W	Reprint the last label (1) (2)	0	None
						1	Reprint the last label
		00000100	4	R/W	High resolution (1) (2)	0	Enable
						1	Disable
		00000101	5	W	Unit change (1)	0	From first to second unit
						1	From second to first unit
		00000110	6	R/W	Key lock (1) (2)	0	Enable
						1	Disable
		00000111	7	W	Dynamic operation (1)	0	Dynamic reset
						1	Dynamic start
		00001000 00001011	8 11	Not used			
		00001100	12	R/W	Basic Peak	0	Enable
						1	Disable
		00001101	13	R/W	Hold	0	Enable
						1	Disable
		00001110 00111110	14 62	Not used			
		00111111	63	R/W	Dynamic filter (1) (2)	Refer to par. 332 page 55	
		01000000	64	R/W	Filter (1) (2)	0	No
						1	Very Low
						2	Low
						3	Medium
						4	High
						5	Very High
		01000001	65	R/W	Power on zero (1) (2)	0	Disable
						1	± %2
						2	± %2LK
						3	± %10
						4	+ %15, - %5
						5	± %20
		01000010	66	R/W	Zeroing Range (1) (2)	0	Disable
						1	± 2%
						2	± 3%
						3	± 20%
						4	± 50%
		01000011	67	R/W	Auto Zero Tracking (1) (2)	0	Disable
						1	± 0,3d
						2	± 0,5d

						3	± 1d
						4	± 2d
						5	± 3d
		01000100	68	R/W	Tare (1) (2)	0	No
						1	Multi tare
						2	Tare only at gross
		01000101	69	R/W	Stability Detection Range (1) (2)	0	± 0,3d
						1	± 0,5d
						2	± 1d
						3	± 2d
						4	± 3d
						5	± 4d
						6	Disable
		01000110	70	R/W	Stability Time (1) (2)	Refer to par. [517] page 59	
		01000111	71	R/W	Unit (1) (2)	0	g
						1	kg
						2	t
						3	lb
						4	No unit
						5	N
						6	kN
						7	kLb
		01001000	72	R/W	Range (1) (2)	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 (1) (2)	Refer to par. 523 on page 59	
		01001010	74	R/W	Decimal point-1 (1) (2)	0	XXXXOO
						1	XXXXXO
						2	XXXXXX
						3	XXXXX.X
						4	XXXX.XX
						5	XXX.XXX
		01001011	75	R/W	Increment-1 (1) (2)	0	X1
						1	X2
						2	X5
		01001100	76	R/W	Capacity-2 (1) (2)		
		01001101	77	R/W	Decimalpoint-2 (1) (2)		
		01001110	78	R/W	Increment-2 (1) (2)		
		01001111	79	R/W	Capacity-3 (1) (2)		
		01010000	80	R/W	Decimalpoint-3 (1) (2)		
		01010001	81	R/W	Increment-3 (1) (2)		
		01010010	82	R/W	Limit of Indication (1) (2)	0	Over indication after Max
						1	1 division more than Max
						2	5 division more than Max
						3	9 division more than Max
						4	2% more than Max
						5	5% more than Max
		01010011	83	R/W	Tare type (1) (2)	0	Subtractive tare
						1	Additive tare
		01010100	84	R/W	Maximum tare (1) (2)	Refer to par. [526] page 59	
		01010101	85	R/W	Secondary unit (1) (2)	0	g
						1	kg
						2	t

						3	lb
						4	No unit
						5	N
						6	kN
						7	kLb

Table 10-3 – Expanded command list

(1) Write this command after writing values to 1st Dword (Output) then apply this command with New CMD.
(2) To access the related value, read 1st Dword (Input).

Programming steps of frequent used commands:

Reading a weight value:

1. Check the B12...B15 bits of 'FT-111 Output to PLC Input 2nd Dword'.
2. If there is not any error, read the 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 1st 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.

11 APPENDIX 2: DATA STRUCTURE CANOPEN

FT-111 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-111				Unit			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 B37...B33.															

FT-111 Output to PLC Input 2nd 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 of FT-111	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
		0111	7	Tilt Switch is active
B43	Unit	0		First unit
		1		Second unit
B42-B41	Not used			
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
		00000	0	Actual weight (if the indication is in Net)

		00001	1	Gross weight	
		00010	2	Tare weight	
		00011	3	ALL Status (Refer to Table 11-1)	
		00100	4	Calibration Status (Refer to Table 11-2)	
		00101	5	Last print value	
		00110 01010	6 10	Not used	
		01011	11	CN (Label number)	
		01100 01110	12 14	Not used	
		01111	15	SetPoint-1 (High)	
		10000	16	SetPoint-2 (High)	
		10001	17	SetPoint-3 (High)	
		10010	18	SetPoint-4 (High)	
		10011	19	SetPoint-5 (High)	
		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Use the Expanded Command list (Refer to Table 11-3)	
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 B37...B33.				

ALL Status (always 32 bit 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-111 Input.

Bit Number	Low Dword of TxPDO 1(T_UL1) Description		
B31	Place of decimal point	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 ... B16	Not in use		
B15	Hold status	0	Passive
		1	Active
B14	Basic Peak status	0	Passive
		1	Active
B13	High resolution status	0	Passive
		1	Active
B12	Centre of zero	0	Weight is out of zero range
		1	Weight is in zero range
B11	Key lock status	0	Passive
		1	Active
B7-B10	Not used		
B6	Unit indication	0	First Unit (power on unit)
		1	Second Unit
B5	Power On Zero	0	Not power on zeroed
		1	Zeroed with power on zero
B4	Not used		
B3	Indication	0	Gross mode
		1	Net mode
B2	Motion Detection	0	Stable
		1	Unstable
B1	Actual Weight or Dynamic Result	0	Weight is actual weight
		1	Weight is dynamic result
B0	Dynamic Operation	0	Dynamic is inactive
		1	Dynamic weight is calculating

Table 11-1– ALL Status table

Calibration Status (always 32 bit 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-111 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 'On' position. - Check the calibration DIP switch.
B9	0	No Error
	1	Scale unstable - Wait until scale become 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 calibrating - Load cell signal is very low or too high
B5	0	No Error
	1	Instrument cannot be calibrating - 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 11-2 - Calibration status

PLC Output to FT-111 Input

Bitwise of a Dword:

Unsigned Long (R/W)	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
	B37-B33 bits defines the usage of this Dword.															

PLC Output to FT-111 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 11-3)				
B47 ... B43	Not in use				
B42 ... B38	Command List	Bin	Dec	Commands	
		00000	0	None 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 (1)	
		00111	7	Total Load Cell Capacity (1)	eCal Coefficients Refer to par. [613]
		01000	8	Average mV/V value (1)	
		01001	9	Dead Load value (1)	
		01010	10	Save the coefficients of eCal	
		01011	11	CN (Label number) (1)	
		01100 01110	12 14	Not used	
		01111	15	Set Point-1 (High)	
		10000	16	Set Point-2 (High)	
		10001	17	Set Point-3 (High)	
		10010	18	Set Point-4 (High)	

		10011	19	Set Point-5 (High)	
		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Use the Expanded Command list (Refer to Table 11-3)	
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 11-1)	
		00100	4	Calibration Status (Refer to Table 11-2)	
		00101	5	Last print value	
		00110 01010	6 10	Not used	
		01011	11	CN (Label number)	
		01100 01110	12 14	Not used	
		01111	15	Set Point-1 (High)	
		10000	16	Set Point-2 (High)	
		10001	17	Set Point-3 (High)	
		10010	18	Set Point-4 (High)	
		10011	19	Set Point-5 (High)	
		10100	20	Not used	
		10101	21	SetPoint-1 Low	Only available for Threshold and Window feature. Refer to sub-block 36-, page 56 to see the availabilities.
		10110	22	SetPoint-2 Low	
		10111	23	SetPoint-3 Low	
		11000	24	SetPoint-4 Low	
		11001	25	SetPoint-5 Low	
		11010 11110	26 30	Not used	
		11111	31	Use the Expanded Command list (Refer to Table 11-3)	
B32	New CMD	Toggle		Apply commands which are listed in this table.	
B31-B0	B37-B33 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						
B23...B16	Expanded Commands List	Bin	Dec	Commands			
		00000000	0	R	Voltage of power supply(2) The value is indicated with 0.1 VDC increment.		
		00000001	1	R	Load cell millivolt value(2) (Only FT-111) Millivolt of active scale is indicated with 0.01 mV increment.		
		00000010	2	R	Command status(2)	Dec	**Descr. of 1st Dword**
						0	None
						1	Command is processing
						2	Command is done
						3	Command failed
		00000011	3	R/W	Reprint the last label (1) (2)	0	None
						1	Reprint the last label
		00000100	4	R/W	High resolution (1) (2)	0	Enable
						1	Disable
		00000101	5	W	Unit change (1)	0	From first to second unit
						1	From second to first unit
		00000110	6	R/W	Key lock (1) (2)	0	Enable
						1	Disable
		00000111	7	W	Dynamic operation (1)	0	Dynamic reset
						1	Dynamic start
		00001000 00001011	8 11	Not used			
		00001100	12	R/W	Basic Peak	0	Enable
						1	Disable
		00001101	13	R/W	Hold	0	Enable
						1	Disable
		00001110 00111110	14 62	Not used			
		00111111	63	R/W	Dynamic filter (1) (2)	Refer to par. 332 page 55	
		01000000	64	R/W	Filter (1) (2)	0	No
						1	Very Low
						2	Low
						3	Medium
						4	High
						5	Very High
		01000001	65	R/W	Power on zero (1) (2)	0	Disable
						1	± %2
						2	± %2LK
						3	± %10
						4	+ %15, - %5
						5	± %20
		01000010	66	R/W	Zeroing Range (1) (2)	0	Disable
						1	± 2%
						2	± 3%
						3	± 20%
						4	± 50%
		01000011	67	R/W	Auto Zero Tracking (1) (2)	0	Disable
						1	± 0,3d
						2	± 0,5d

						3	± 1d
						4	± 2d
						5	± 3d
		01000100	68	R/W	Tare (1) (2)	0	No
						1	Multi tare
						2	Tare only at gross
		01000101	69	R/W	Stability Detection Range (1) (2)	0	± 0,3d
						1	± 0,5d
						2	± 1d
						3	± 2d
						4	± 3d
						5	± 4d
						6	Disable
		01000110	70	R/W	Stability Time (1) (2)	Refer to par. [517] page 59	
		01000111	71	R/W	Unit (1) (2)	0	g
						1	kg
						2	t
						3	lb
						4	No unit
						5	N
						6	kN
						7	kLb
		01001000	72	R/W	Range (1) (2)	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 (1) (2)	Refer to par. 523 on page 59	
		01001010	74	R/W	Decimal point-1 (1) (2)	0	XXXXOO
						1	XXXXXO
						2	XXXXXX
						3	XXXXX.X
						4	XXXX.XX
						5	XXX.XXX
		01001011	75	R/W	Increment-1 (1) (2)	0	X1
						1	X2
						2	X5
		01001100	76	R/W	Capacity-2 (1) (2)		
		01001101	77	R/W	Decimalpoint-2 (1) (2)		
		01001110	78	R/W	Increment-2 (1) (2)		
		01001111	79	R/W	Capacity-3 (1) (2)		
		01010000	80	R/W	Decimalpoint-3 (1) (2)		
		01010001	81	R/W	Increment-3 (1) (2)		
		01010010	82	R/W	Limit of Indication (1) (2)	0	Over indication after Max
						1	1 division more than Max
						2	5 division more than Max
						3	9 division more than Max
						4	2% more than Max
						5	5% more than Max
		01010011	83	R/W	Tare type (1) (2)	0	Subtractive tare
						1	Additive tare
		01010100	84	R/W	Maximum tare (1) (2)	Refer to par. [526] page 59	
		01010101	85	R/W	Secondary unit (1) (2)	0	g
						1	kg

						2	t
						3	lb
						4	No unit
						5	N
						6	kN
						7	kLb

Table 11-3 - 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 used commands:

Reading a weight value:

1. Check the B47...B44 bits of TxPDO 1 (T_UL1).
2. If there is not any error, read the weight value (gross, net or tare).

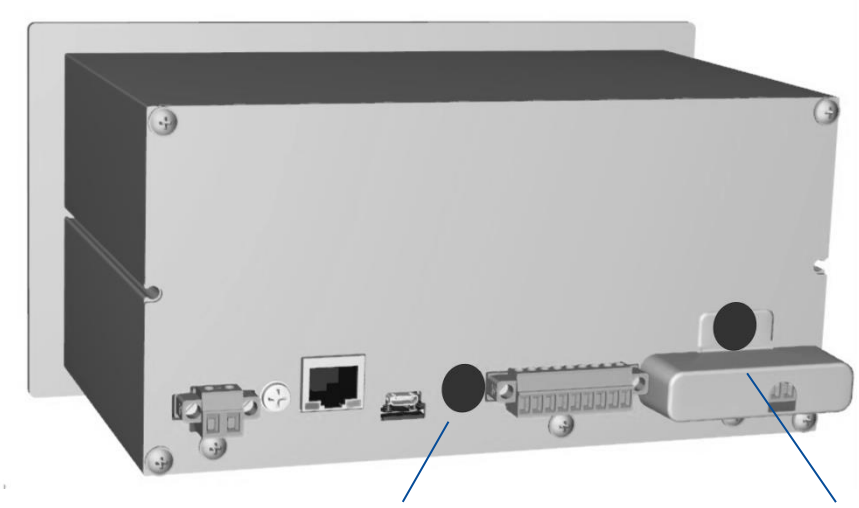
Zero Calibration procedure:

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:

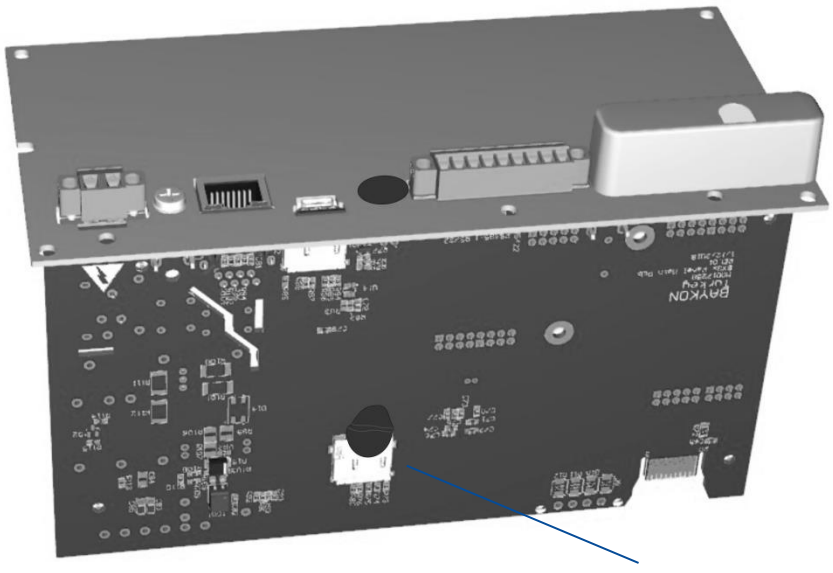
1. Check the Bit-0 of Calibration Status. it should be '1'(set) to start adjustment.
2. Write 'Adjust Span Calibration' command after writing test weight values to Low Dword of RxPDO 1 (R_UL1), then apply this command with New CMD to start Span calibration.
3. Check the Bit-1 of Calibration Status. it 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.

12 SEALING OF APPROVED SCALE



Sealing of Calibration switch

Sealing of Load cell connector



Alibi SD card sealing

13 TROUBLE SHOOTING

FT-111 weighing indicator had been designed as a very reliable and virtually error free instrument. However, if there is 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 according to the error table given below.

ERROR CODE	DESCRIBTION	THINGS TO DO
	Weight is too low	- Check the load - Load cell or instrument could be broken.
	Over Load	
LC Err	Load exceeds the operation range	- Check the load - Check the calibration - Load cell or instrument could be broken.
+POWERONZEROERR	Weight is out of power on zero range.	- Press  key to start indication Without zeroing and call service.
-POWERONZEROERR		
LOW VOLT PWR OFF	Power source voltage is less than 9 VDC.	- Check the power supply voltage.
HIGH VOLT PWROFF	Voltage is more than 30 VDC.	
E01 ADC ERROR	ADC initialization error. ADC could not initialize at power on. ADC or its interface circuitry has a malfunction.	- Power off the instrument reenergizes it after 30 seconds. - Check external load cell connection. - Check load cell connector in the instrument. - Change main board or second scale board.
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.	
E09 DISPLAY COMM	Communication error between display board and main board.	- Power off the instrument reenergizes it after 30 seconds. - If not, change main board.
E10 NVM VERSION	NVM version error. Factory default will be loaded.	- If you changed the E^2ROM (U13) press Enter key. The factory defaults will be loaded. - If not, change main board.
E20 CALIBRATION	Checksum error of calibration coefficients.	- Check the scale performance. - Recalibrate the scale. - Change mainboard.
E21 SETUP ERROR	Check sum error of parameters.	- Check the scale performance. - Recalibrate the scale. - Change mainboard.
E22 CHECKSUM ERR	Checksum error of the data.	- Change E^2ROM (U13).
E23 HEADER ERR	Header checksum error.	- Press enter key and re-enter the headers. - Change E^2ROM (U13).

E24 FOOTNOTE ERR	Footnote checksum error.	- Press enter key and re-enter the footers. - Change E^2ROM (U13).
E25 FBUS SETUP E	Fieldbus set up error.	- Press enter key and re-enter the fieldbus setup. - Change E^2ROM (U13).
E26 SETPOINT ERR	Setpoint (limit values) checksum error.	- Press enter key and re-enter the setpoint (limit) values. - Change E^2ROM (U13).
E28 CLOCK ERROR	Clock error.	- Change CR2032 battery. - Change the main board.
E32 LABEL ERROR	Checksum error of EPL printout format.	- Press enter key and re-load the EPL code. - Change E^2ROM (U13).
E34 NOT LOADED	ADC output is not changed for the span calibration.	- Recalibrate the scale. - Change mainboard.
E35 LC CONNECTIO	The load cell output is decreased after loading.	- Check load cell connections. - Check test weight loading. - Recalibrate the scale. - Change mainboard.
E36 ADD LOAD	The load is not enough for span calibration.	
E37 UNSTABLE	The load is not stable at calibration.	- Wait until scale become stable. - Check grounding wiring. - Recalibrate the scale. - Change mainboard.
E40 NO ALIBI SD	Alibi memory SD card is not installed.	- Disable Alibi memory if not required. - Check Alibi SD card. - Change mainboard.
E41 ALIBI FAULT	Alibi SD card is not supplied from FLINTEC.	- Install Flintec Alibi SD card.
E42 NEW ALIBI	Alibi memory serial number error. The new alibi SD card is installed.	- Format the alibi memory SD card. Refer to parameter 816.
E43 ALIBI ERROR	Alibi memory could not be initialized.	- Check alibi memory SD card - Change main board.
E44 ALIBI CSUM E	Alibi CSUM error.	- Check alibi memory records. - Change Alibi memory SD card. - Change main board.
E47 ALIBI CSUM E	Alibi information CSUM error.	
E48 ALIBI SD ERR	Wrong SD card at alibi memory.	- Order Alibi SD card.
E50 DLC CARD FAI	The DLC Board is broken or not installed.	- Re-energize indicator. - Change the DLC Board.
E61 FLASH ERROR	E2PROM Error.	- Change main board.
E70 MB SELECT ER	Modbus selection error	- Check data format of other interfaces. - Other interfaces should not be Modbus.
E75 MODBUS FAULT	The Modbus SD card is not installed in SD2 card slot.	- Order Modbus SD card. - Install Flintec Modbus SD card.
E80 VERIFY SCALE	Reverification the scale.	- Reverify the scale after checking the scale hardware, load cells, performance etc.

E81 CANNOT ADDR	DLC could not addressed.	- Check the DLC connection (RS-485 & Power supply) hardware. - Check the DLC and S/N.
E82 SHIFT ADJUST	Shift adjustment is not available due to load cell coefficients are out of limits.	- Check addressing is done correctly. - Check test weight loading on the correct DLC. - Check the load cell installation and scale installation.
E83 DLC COUNT ER	No regular response from load cell	- Reenergize the indicator. - Check the DLC connection (RS-485 & Power supply). - Change load cell.
E84 SN NOT MATCH DLC yy (1)	The address and S/N of the load cell do not match.	- Check the DLC and S/N. - Reenergize the indicator. - Readdress the DLC.
E85 DLC TIMEOUT DLC yy (1)	Communication time out	- Check the DLC connection (RS-485 & Power supply) hardware. - Check the DLC and S/N.
E86 DLC COM ERR DLC yy (1)	Status error of load cell	- Change load cell.
E87 DLC UNDER DLC yy (1)	The DLC is under	- Check mechanical installation and DLC.
E88 DLC OVER DLC yy (1)	The DLC is over	- Check mechanical installation and DLC.
E89 DLC CHKSUM DLC yy (1)	Checksum error	- Check termination resistors. - Check the DLC connection (RS-485 & Power supply) hardware.
E90 DLC PWR ERR	Power supply of DLCs could not detected.	- Check the main board.
E91 DLC SYSTEM	Internal communication error between the DLC board and the indicator.	- Change the DLC board. - Change the main board.
E92 DLC UNMATCH	Capacity of the load cell is different.	- Check capacity of the DLC

1) yy = Number/Address of the digital load cell.

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