SWIFT FIELD BUS MANUAL

ETHERNET/IP
PROFIBUS
PROFINET

Software version: ver.1.005X

Revision: 02/02/2017

INDEX

1 Bus field options

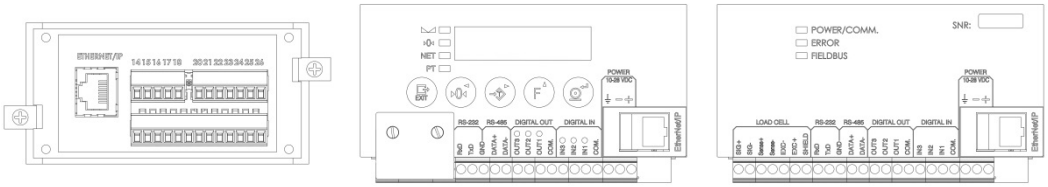
SWIFT indicator has two different field bus options.

- ETHERNET/IP
- PROFIBUS
- PROFINET

Both hardware options use the same memory map and the same mechanisms to accede to the indicator's data. This means that independently of the type of interface and cable used, the Master device (PLC) accedes to the information in the same way.

When the field bus is activated and there is no communication with the Master device (PLC) a "NO COM" message will appear blinking on the screen alternating with the weight.

1.1 Communication option ETHERNET/IP



ETHERNET/IP connector in SWIFT Panel, Rail and SWIFT COM

1.1.1 Indicator configuration

EtherNetIP option is configured in the ETH_ IP section of the SWIFT's SETUP. In this menu we have three submenus with the following parameters:

- ACT IVE: Selects whether or not to use the fieldbus (ON / OFF).
- IP Con: Set the IP address
- Sn Con: Configures the subnet mask.

For more information, see: "***SWIFT Operation and Configuration Manual***"

1.1.2 PLC configuration

To access into the two data areas (input / output), we will use the I / O data area of the EtherNetIP. This input / output zone is accessed with Class 1 (cyclic) messages. The Access propierties to access to these two areas are as follows:

Address

Input area from the PLC side. These are the output data that the SWIFT "produces" ("produced data") to the PLC:

Class: 4 Instance: 100 Atribute: 3

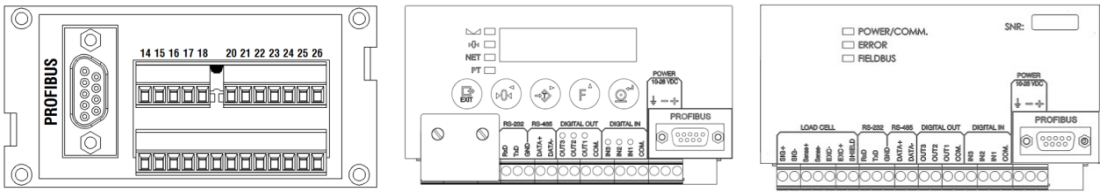
Output area from the PLC side. These are the data that the PLC writes and the SWIFT "Consumes" ("consumed data"):

Class: 4 Instance: 150 Atribute: 3

Size

Both input and output areas have a size of 46 bytes (23registers of 16 bits). Access to this memory can be done with implicit commands to have more speed and allow the communication in real time.

1.2 Communication option PROFIBUS

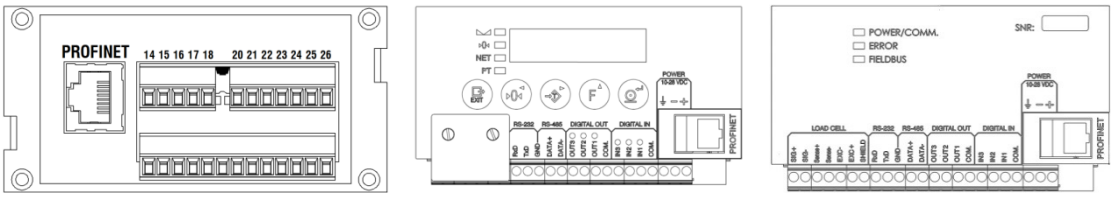


PROFIBUS connector in SWIFT Panel, Rail and SWIFT COM

It incorporates a PROFIBUS-DP interface working as a slave node to communicate with a PROFIBUS-DP Master device. It implements DP-V0 variant.

The identification of the different devices on a PROFIBUS network is made by the address. To see how to configure the address, see: **"*SWIFT Operation and Configuration Manual*".**

1.3 Communication option PROFINET



PROFINET connector in SWIFT Panel, Rail and SWIFT COM

PROFINET interface provides real time (RT) PROFINET IO communication with the device (equipment that works as a "slave") to communicate with a controller (equipment that works as a "Master").

The device must have a unique name across the network to be able to communicate.

The configuration of this name can be done from the indicator's menu or through the PLC configuration software.

For more information, see: **"*SWIFT Operation and Configuration Manual*".**

A PROFINET network uses three different addresses to communicate: MAC address, IP address and the device name (a logic name for the module that is unique across the total configuration):

- MAC address must be unique for each device and cannot be changed.
- IP address must be unique and can be assigned by the Master. Our device doesn't allow the IP address configuration from the indicator's menu so the IP address must be assigned from the Master when initializing connection.
- The name of the device must be unique. This name is the parameter that identifies the device across the network. When there is a need to replace a damaged device, the new device must be configured with the same name than the old one to be able to be recognized by the PLC.

1.4 Configuration files

Both PROFIBUS and PROFINET use configuration files to indicate to the programming software of the PLC the communication parameters required. The files can be downloaded from the UTILCELL website: www.utilcell.es

PLC configuration files	
Field bus	File name
EtherNet/IP	005A000C00020300.eds
PROFIBUS	hms_1810.gsd
PROFINET	GSDML-V2.3-HMS-ABICPRT-20130219.xml

1.5 Communication format

The Weight and the status are sent to the Master across the field bus. Also, it's possible to accede to the parameters and calibration of the device.

To communicate with the Master, the device uses an Input section (write from the Master) and an Output section (read from the Master). These sections appear as input/output blocks for the ETHERNET/IP / PROFIBUS / PROFINET network and there is a cyclic interchange of information between the Master and the Slave. In our case, these two sections have a size of 46 bytes each one.

In order to execute functions in the device we need to use a command register that receive the orders from the Master.

Due to the quantity of configurable parameters of the device, we have divided the input/output sections in a non-paged section and a paged section. By selecting different pages we have access to the different parameters of the device. This configuration is represented in the next table.

	Address (BYTES)	OUTPUT AREA (read from Master)	INPUT AREA (write from Master)
NON-PAGED SECTION	0 - 1 … … … 26 - 27	Output section Non-paged	Input section Non-paged
PAGED SECTION	28 - 29 … … … 44 - 45	Output section paged	Input section paged

Memory registers from 0 to 27 are the non-paged section and contain the input and output data that are always accessible from the Master.

Registers from 28 to 45 are the paged section and its content depends on the selection of the *Command Register* (write addresses 12,13) and the page selection register to read or write (write addresses 16,17).

Paged section has two different types of page:

1- Read/write pages: Is possible to read and write the content of these pages. These pages are numbered starting from 1 but always lower than 100.
2- Only read pages: These pages contain information that can be only read. These pages are numbered starting from 100.

1.5.1 Memory mapping

1.5.1.1 Non paged Output Section (read from Master)

READ			
Bytes Input area			
Address	**Nº bytes**	**Description**	**Range Value**
0	2	SetPoint1(High)	
2	2	SetPoint1(Low)	
4	2	SetPoint2(High)	
6	2	SetPoint2(Low)	
8	2	SetPoint3(High)	
10	2	SetPoint3(Low)	
12	2	Gross weight(High)	
14	2	Gross weight(Low)	
16	2	Net weight (High)	
18	2	Net weight (Low)	
20	2	Status weight	See table “1-A”
22	2	Input/output status	See table “1-B”
24	2	**Command Status Register**	See table "1-D"
26	2	Number of last page read	

1.5.1.2 Non paged Input Section (write from Master)

WRITE			
Bytes Output area			
Address	**Nº bytes**	**Description**	**Range Value**
0	2	SetPoint1(High) (1-2)	-CAP…CAP (1-3)
2	2	SetPoint1(Low) (1-2)	
4	2	SetPoint2(High) (1-2)	-CAP…CAP (1-3)
6	2	SetPoint2(Low) (1-2)	
8	2	SetPoint3(High) (1-2)	-CAP…CAP (1-3)
10	2	SetPoint3(Low) (1-2)	
12	2	**Command Register**	See table "1-C"
14	2	Digital outputs	0…7 (1-1)
16	2	Page number to read or to write	
18	2	DataWrValue(High)	
20	2	DataWrValue(Low)	
22	2	Reserved…	
24	2	Reserved…	
26	2	Reserved…	

(1-1) To enable the modification of the status of a digital output it must be configured as "PC_Ctr".
Bit 0 corresponds to the relay 1, bit 1 to the relay 2, bit 2 to the relay 3.

(1-2) To update setpoint of the equipment it is necessary to write the corresponding command in the Command Register (commands CMD_WR_SETP or CMD_WR_SETP_E2P).

(1-3) This value must be multiple of the digital division and the decimal point of the equipment. It can never be lower than -99999.

1.5.1.2.1 Using command registers and status command register

To send an order to the device and check the execution of the order we need to use two registers of 16 bits, one to write: *Command register* and another to read: *Command Status register.* With the first command we send the order and reading the second command we check the response of the device.

Due to the way that the information is exchanged between master and slave (cyclic transmission of data) it's necessary to use one bit to mark when we want to execute a new command. This bit is the bit 15 of the *Command register* (write address 12 and 13). The device executes a command when there is a transition from "0" to "1" of this bit, so we need to write the command with this bit at "0" and then switch this bit to "1". The format of this register is as follows:

Command register															
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Exec	- not used -							Command							

Example: In order to set a semi-automatic tare, we will send the command: CMD_TARE (code 2). We need to write on the *Command register* the value 2:

In hexadecimal is: (16 bits) 0x0002: Register 12: 0x00 Register 13: 0x02

Now we will write on the bit Exec (bit 15) a "1" to order to the device to execute the command, to do this we need to write the value 0x80 in the register 12. Therefore, it will be:

Register 12: 0x80 Register 13: 0x02 → *Command register* = 0x8002

Reading the *Command Status Register* we will see the response of the device. This register has the following format:

Command Status Register															
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Counter		Status code						Command							

Counter: Is a cyclic counter of 2 bits that increase each time the device accepts a command.

Status code: These bits will show the numerical value that corresponds to the state of the command execution. See table "1-D".

Command: Is the same command code that is written in the *Command register* with the exception of the command CMD_CANCEL in that case, appears the command code that is cancelled.

When the status code shows *Device busy* the device will not answer to any command. This indicates that the device needs to finish executing an action before accepting more commands.

1.5.1.2.1.1 Command performance details

The list of commands available is shown in table 1-C.

1.5.1.2.1.1.1 CMD_PTARE

Command to set a pre-set tare.
This command must be executed with the *DataWrValue* registers of the non-paged section.
Procedure:

1. Write on *DataWrValue registers* (18…21 non paged input section) the value of the pre-set tare. This value must be compatible with the device division.
2. Execute CMD_PTARE command.

1.5.1.2.1.1.2 CMD_ZERO_CAL

This command sets the calibration zero of the scale.
To execute this command, the device must be in REMOTE mode with the calibration switch in the UNPROTECTED position.

Be aware that the scale is empty before sending this command.
Procedure:

1. Set the device in REMOTE mode and set the calibration switch to UNPROTECTED.
2. Be aware that the scale is empty.
3. Send command CMD_ZERO_CAL to calibrate.
4. Read ***Command Status Register*** to see the result of the execution.
5. This adjustment is saved in the non-volatile memory without the need of executing the command CMD_SAVE_E2P.

1.5.1.2.1.1.3 CMD_SPAN_CAL

This command sets the calibration span of the scale using a known mass.
To execute this command, the device must be in REMOTE mode with the calibration switch in the UNPROTECTED position.
Before sending this command we must write in the *DataWrValue* registers (registers 18…21 of the non-paged input section) the value of the weight that is on the scale.
Procedure:

1. Set the device in REMOTE mode and set the calibration switch to UNPROTECTED.
2. Write in *DataWrValue* registers the value of the calibration mass.
3. Put the calibration mass on the scale and check that the weight is stable.
4. Send command CMD_SPAN_CAL to calibrate.
5. Read ***Command Status Register*** to see the result of the execution.
6. This adjustment is saved in the non-volatile memory without the need of executing the command CMD_SAVE_E2P.

1.5.1.2.1.1.4 CMD_NUM_CAL

Numerical calibration of the span.
To execute this command, the device must be in REMOTE mode with the calibration switch in the UNPROTECTED position.
Before sending this command we must write in the variables on page 19 the correct values using CMD_WR_PAGE command.
Procedure:

1. Set the device in REMOTE mode and set the calibration switch to UNPROTECTED.
2. Write the correct values of the following variables: **LCAP** (load cell capacity), **Lno** (number of load cells), **LSn** (average sensitivity of load cells), **Dead Load** (dead load).
3. Send command CMD_NUM_CAL.

1.5.1.2.1.1.5 CMD_FORCE_BLIND

Blind function allows to turn off the display, leaving only a blinking point (see **"*SWIFT Operation and Configuration Manual*"** to configure this function).

Apart from the automatic function that works with the timer, is possible to set the device in BLIND mode independently of the configuration of this function on the SETUP's device.

This option can only be activated when the device is on the main screen. To exit this mode is needed to press the EXIT key.

1.5.1.2.1.1.6 CMD_EXIT_BLIND

This command disables the BLIND function. If the function was not enabled it does nothing. If we have the display off due to the BLIND function (doesn't matter if it was enabled automatically with the timer or with the CMD_FORCE_BLIND command), when we send the command CMD_EXIT_BLIND the display will turn on. In case of having the BLIND function enabled with the timer, when the time set finished, the display will turn off again.

1.5.1.2.1.1.7 CMD_RD_PAGE

Command to read a page.
This command must to be used with the register 16 of the non-paged input section.
Procedure:

1. We must write the number of the page we want to read in the register 16.
2. Execute command CMD_RD_PAGE. When executing this command the paged output section is updated with the content of the selected page.

1.5.1.2.1.1.8 CMD_WR_PAGE

Command to write a page.
This command must to be used with the register 16 of the non-paged input section.
Procedure:

1. Write in the paged input section (registers 28...45) the content of the data to write.
2. Write in the register 16 of the non-paged input section the number of the page where the data will be copied.
3. Execute command CMD_WR_PAGE.
4. Read ***Command Status Register*** (register 24 of the non-paged output section) to know if the write has been done correctly.

The write command will fail if the range of values wrote is not compatible with the corresponding variable. To write the values of the variables there can not be any failure. If there is a failure in one of the variables of the page, the rest of the variables will not be written.

1.5.1.2.1.1.9 CMD_SAVE_E2P

Write in the non-volatile memory (E2PROM) the modified variables with the last CMD_WR_PAGE command sent.
Be aware: This command only saves the variables of the last CMD_WR_PAGE command so if we are going to write in more than one page, we will need to send CMD_SAVE_E2P command before write in the next page. If we don't follow these steps, the modification of the variables will be only done in RAM and will be lost when the device is turned off.

1.5.1.2.1.1.10 CMD_CALSWITCH_SW

Command that changes the State of software calibration seal.
This command must be used with DataWrValue registers of the non-paged zone.
Procedure:

- Write PIN code in DataWrValue(High) register (Register 18).
- Write new desired value for the software calibration seal. (0:opened, 1:closed) on DataWrValue(Low) register (Register 20).
- Excecute CMD_CALSWITCH_SW command.

1.5.1.2.1.2 Status code depending on the command

When the execution of a command is finished correctly the device will return ST_ACK (0x01).

The following list shows the different responses of the device depending on the command sent when the response is not ST_ACK.

CMD_ZERO command:

- ST_RUNNING: Operation in execution.
- ST_ERROR: Command ended with errors. Has not been possible to set the zero.
- ST_CANCELLED: Command cancelled (requires sending CMD_CANCEL).

CMD_TARE command:

- ST_RUNNING: Operation in execution.
- ST_ERROR: Command ended with errors. Has not been possible to set a semi-automatic tare.

- ST_CANCELLED: Command cancelled (requires sending CMD_CANCEL).

CMD_PTARE command:
- ST_INVALID_DATA: Tare value introduced is not valid.

CMD_PRINT command:
- ST_RUNNING: Operation in execution.
- ST_ERROR: Command ended with errors. The ticket cannot be created.
- ST_CANCELLED: Command cancelled (requires sending CMD_CANCEL).

CMD_STARTCW command:
- ST_NAK: The device is not in Checkweigher mode.
- ST_ERROR: Device busy or is not allowed the Start by command.

CMD_CTOTAL command:
- ST_NAK: Accumulation option is not enabled or there are not accumulated operations.
- ST_ERROR: Weighing in execution, is not possible to close accumulation.

CMD_ZERO_CAL command:
- ST_PROTECTED: Device is not in UNPROTECTED mode.
- ST_E2P_ERROR: Error while writing on E2P.
- ST_BUSY: Operation in execution, device busy (indicator doesn't accept commands).

CMD_SPAN_CAL command:
- ST_PROTECTED: Device is not in UNPROTECTED mode.
- ST_E2P_ERROR: Error while writing on E2P.
- ST_INVALID_DATA: Weight introduced to calibrate is not valid.
- ST_BUSY: Operation in execution, device busy (indicator doesn't accept commands).

CMD_NUM_CAL command:
- ST_PROTECTED: Device is not in UNPROTECTED mode.

CMD_RESET command:
- ST_RUNNING: Operation in execution.

CMD_SAVE_E2P command:
- ST_NAK: There is not an active page to save in E2P.
- ST_ERROR: There are no data to save (there has not been any write on the page since the last time saved).
- ST_E2P_ERROR: Error while writing on E2P.

CMD_PAGE_RD_SEL command:
- ST_NAK: Asked page doesn't exist.
- ST_BUSY: Operation in execution, device busy (indicator doesn't accept commands).

CMD_PAGE_WR_SEL command:
- ST_INVALID_DATA: On page 15 (Scale definition) this error appears if the division introduced is not corrector or if the division number of the SPAN (CAPACITY/DIVISION) is above 100.000.
- ST_NAK: There is a parameter out of range.

CMD_WR_SETPOINTS command:
- ST_INVALID_DATA: The set point value is not valid.

CMD_WR_SETPOINTS_E2P command:
- ST_INVALID_DATA: The set point value is not valid.
- ST_E2P_ERROR: Error while writing on E2P.

CMD_CALSWITCH_SW comando
- ST_PROTECTED: Incorrect PIN or callibration number equal to 9999.
- ST_INVALID_DATA: Incorrect new state value for software calibration seal.
- ST_E2P_ERROR: Error while writting on E2P.

*1.5.1.3 **Parameter tables of the non-paged Read and Write section***

Table "1-A"			
Register "Weight status"			
Bit	**Description**	**Meaning**	
		0	1
0	Weight stability	Off	On
1	Zero indication	Off	On
2	Net Led	Off	On
3	Pre-set Tare Led	Off	On
4	Underload	No	Yes
5	Overload	No	Yes
6	Error Ref.	No	Yes
7	ADC error	No	Yes
8...10	Weight decimal point (3bits)	...	...
11	Instrument On-Line	No	Yes
12	ADC Fault	No	Yes
13	LowBat	No	Yes
14	Reserved		
15	Reserved		

Table "1-B"			
Input/Output Status			
Bit	**Description**	**Meaning**	
		0	1
0	Digital input 1	Off	On
1	Digital input 2	Off	On
2	Digital input 3	Off	On
3	Relay 1	Off	On
4	Relay 2	Off	On
5	Relay 3	Off	On

Table "1-C"				
Command Registers (Write)				
Bit	**Description**		**Code**	
	Command		Dec.	Hex.
	Name	*Command description*		
0…7	CMD_ZERO	Semi-automatic zero	1	0x01
	CMD_TARE	Semi-automatic tare	2	0x02
	CMD_PTARE	Pre-set tare	3	0x03
	CMD_CTARE	Exit tare	6	0x06
	CMD_PRINT	Print ticket	7	0x07
	CMD_STARTCW	Start checkweigher	10	0x0A
	CMD_CTOTAL	Exit accumulation	11	0x0B
	CMD_ZERO_CAL	Zero calibration	16	0x10
	CMD_SPAN_CAL	SPAN calibration	17	0x11
	CMD_NUM_CAL	Execute numerical calibration	18	0x12

	CMD_RESET	Reset indicator	30	0x1E
	CMD_CALSWITCH_SW	Change software calibration seal state (1-9)	20	0x16
	CMD_SAVE_E2P	Save page to E2P (1-4)	32	0x20
	CMD_FORCE_BLIND	Force BLIND mode	40	0x28
	CMD_EXIT_BLIND	Exit BLIND mode	41	0x29
	CMD_CANCEL	Cancel a command in execution	100	0x64
	CMD_CHKW_TESTON(1-8)	CheckWeigher mode TEST ON	42	0x2A
	CMD_CHKW_TESTOFF	CheckWeigher mode TEST OFF	43	0x2B
	CMD_RD_PAGE	Read of the selected page	101	0x65
	CMD_WR_PAGE	Write on the selected page	102	0x66
	CMD_WR_SETP	Setpoints update (1-5)	103	0x67
	CMD_WR_SETP_E2P	Setpoints update write on E2P (1-5)	104	0x68
8...14	Not used			
15	The change from 0 to 1 of this bit executes the command specified in bit 0 to 7			

Table "1-D"

Status command register (Read)

Bit	Description		Value
0…7	Command received		0…255
8…13	Status code		
	ST_ACK	*Command accepted*	1
	ST_NAK	*Command not accepted*	2
	ST_RUNNING	*Command in execution*	3
	ST_CANCELLED	*Command cancelled* (1-6)	4
	ST_BUSY	*Indicator busy*	5
	ST_INVALID_DATA	*Invalid data command*	6
	ST_ERROR	*Error while executing command*	7
	ST_E2P_ERROR	*Error saving on E2PROM*	8
	ST_PROTECTED	*Protected parameter*	9
14,15	Cyclic counter of 2 bits (1-7)		0…3

(1-4) Command CMD_SAVE_E2P saves the data on the page written by CMD_WR_PAGE command, to do this is necessary to send the command just after writing the page. If we change the page, the page written before will not be saved with CMD_SAVE_E2P command.

(1-5) Sending that command, the three setpoints written in the write registers from 0 to 11 will be copied to the indicator's setpoints. If we use command 103 (CMD_WR_SETP) they will not be saved on E2PROM so they will be lost when turning off the device. If we use command 104 (CMD_WR_SETP_E2P) the values will be saved in the E2PROM. E2PROM memory has a writing limit of 1.000.000 writings so we should avoid writing constantly in that memory. Systems that need to send the set point constantly should use CMD_WR_SETP command that modifies only the RAM.

(1-6) This code indicates that the command on bits 0…7 has been cancelled with command **Cancel** (code 100. See table "1-C").

(1-7) The cyclic counter increments each time that the device receives a new command.

(1-8) This parameter is not saved in the NVM, after a reset of the indicator the TEST option turns OFF.

(1-9) To change software calibration seal state, write PIN code in DataWrValue(High) register, desired value in DataWrValue(LOW) register and excecute command 20d.

*1.5.1.4 **Paged read/write section***

This section has 22 pages, from page 1 to page 22:

PAGE 1 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
RS-485 menu					
28	2	28	2	Type	0:Off,1:dE,2:St,4:ASCII,5:RTU, 6:DAT
30	2	30	2	Format	0…13 (2-6)
32	2	32	2	Baudrate	0…5 (2-7) see table "2-F"
34	2	34	2	Parity	0…2 → 0:None, 1:Even, 2:Odd
36	2	36	2	Transmission rate (Out. rate)	0…8 (2-8) see table "2-G"
38	2	38	2	Termination	0…3 (2-9) see table "2-H"
40	2	40	2	Protocol	0: None, 1: RS485
42	2	42	2	Address	1…99

Changes on RS-485 parameters will be available after restarting the indicator.

PAGE 2 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
RS-232 menu					
28	2	28	2	Type	0:Off,1:dE, 2:St,3:Ti, 6:DAT
30	2	30	2	Format	0…13 (2-6)
32	2	32	2	Baudrate	0…5 (2-7) see table “2-F"
34	2	34	2	Parity	0…2 → 0:None, 1:Even, 2:Odd
36	2	36	2	Transmission rate (Outout rate)	0…8 (2-8) see table “2-G"
38	2	38	2	Termination	0…3 (2-9) see table “2-H"
40	2	40	2	Empty (2-25)	
42	2	42	2	Address	1…99

Changes on RS-232 parameters will be available after restarting the indicator.

PAGE 3 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
A_Out menu – Analog output					
28	2	28	2	Type	0:Gross 1:Net
30	2	30	2	Output	0: 4-20mA, 1: 0-20mA, 2: 0-5V, 3: 0-10V
32	2	32	2	Error	0:FULL, 1: HOLD, 2: MIN
34	2	34	2	Aout_0 (H)	0…CAP (2-13)
36	2	36	2	Aout_0 (L)	
38	2	38	2	Aout_F (H)	0…CAP (2-13)
40	2	40	2	Aout_F (L)	
42	2	42	2	Aout.F0	0…0x1999
44	2	44	2	Aout.FF	0…0x1999

PAGE 4 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_Out menu – Digital output 1 (1/2)					
28	2	28	2	UL1 Setpoint 1 (H)	–CAP…CAP (2-20)
30	2	30	2	UL1 Setpoint 1 (L)	
32	2	32	2	Type 1	0…14 (2-10) see table “2-I"
34	2	34	2	Rel 1	0…2 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3
36	2	36	2	Trip 1	0…3 (2-11) see table “2-J"
38	2	38	2	Band 1 (H)	0…CAP (2-13)
40	2	40	2	Band 1 (L)	
42	2	42	2	Hy 1 (H)	0…CAP (2-13)
44	2	44	2	Hy 1 (L)	

PAGE 5 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
Menu D_Out - Digital output 1 (2/2)					
28	2	28	2	d_Loc 1	0:OFF, 1:ON
30	2	30	2	Timer 1	0…200 200 is the equivalent of 20.0s
32	2	32	2	Delay 1	0…200 200 is the equivalent of 20.0s

PAGE 6 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_Out menu - Digital output 2 (1/2)					
28	2	28	2	UL2 Setpoint 2 (H)	–CAP…CAP (2-20)
30	2	30	2	UL2 Setpoint 2 (L)	
32	2	32	2	Type 2	0…14 (2-10) see table “2-I"
34	2	34	2	Rel 2	0…2 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3
36	2	36	2	Trip 2	0…3 (2-11) see table “2-J"
38	2	38	2	Band 2 (H)	0…CAP (2-13)
40	2	40	2	Band 2 (L)	
42	2	42	2	Hy 2 (H)	0…CAP (2-13)
44	2	44	2	Hy 2 (L)	

PAGE 7 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_Out menu - Digital output 2 (2/2)					
28	2	28	2	d_Loc 2	0:OFF, 1:ON
30	2	30	2	Timer 2	0…200 200 is the equivalent of 20.0s
32	2	32	2	Delay 2	0…200 200 is the equivalent of 20.0s

PAGE 8 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_Out menu - Digital output 3 (1/2)					
28	2	28	2	UL3 Setpoint 3 (H)	–CAP…CAP (2-20)
30	2	30	2	UL3 Setpoint 3 (L)	
32	2	32	2	Type 3	0…14 (2-10) see table “2-I"
34	2	34	2	Rel 3	0…2 0:Setpoint 1 1:Setpoint 2 2:Setpoint 3
36	2	36	2	Trip 3	0…3 (2-11) see table “2-J"
38	2	38	2	Band 3 (H)	0…CAP (2-13)
40	2	40	2	Band 3 (L)	
42	2	42	2	Hy 3 (H)	0…CAP (2-13)
44	2	44	2	Hy 3 (L)	

PAGE 9 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_Out menu - Digital output 3 (2/2)					
28	2	28	2	d_Loc 3	0:OFF, 1:ON
30	2	30	2	Timer 3	0…200 200 is the equivalent of 20.0s
32	2	32	2	Delay 3	0…200 200 is the equivalent of 20.0s

PAGE 10 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_In menu – *Digital input 1*					
28	2	27	2	Type 1	0: OFF, 1: TARE 2: CLR TARE 3: ZERO, 4:PRINT, 5:START,6:CLRTOTAL
30	2	28	2	Func 1	0: LOW 1: HIGH

PAGE 11 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_In menu – *Digital input 2*					
28	2	27	2	Type 2	0: OFF, 1: TARE 2: CLR TARE 3: ZERO, 4:PRINT, 5:START,6:CLRTOTAL
30	2	28	2	Func 2	0: LOW 1: HIGH

PAGE 12 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
D_In menu – *Digital input 3*					
28	2	27	2	Type 3	0: OFF, 1: TARE 2: CLR TARE 3: ZERO, 4:PRINT, 5:START,6:CLRTOTAL
30	2	28	2	Func 3	0: LOW 1: HIGH

PAGE 13 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
Binary setpoints 1…4					
28	2	28	2	Binary mode status	0:OFF 1:ON (2-24)
30	2	30	2	Setpoint 1 BINOUT (H) (2-23)	–CAP…CAP (2-20)
32	2	32	2	Setpoint 1 BINOUT (L) (2-23)	
34	2	34	2	Setpoint 2 BINOUT (H) (2-23)	–CAP…CAP (2-20)
36	2	36	2	Setpoint 2 BINOUT (L) (2-23)	
38	2	38	2	Setpoint 3 BINOUT (H) (2-23)	–CAP…CAP (2-20)
40	2	40	2	Setpoint 3 BINOUT (L) (2-23)	
42	2	42	2	Setpoint 4 BINOUT (H) (2-23)	–CAP…CAP (2-20)
44	2	44	2	Setpoint 4 BINOUT (L) (2-23)	

PAGE 14 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
Binary setpoints 5…7					
28	2	28	2	Setpoint 5 BINOUT (H) (2-23)	–CAP…CAP (2-20)
30	2	30	2	Setpoint 5 BINOUT (L) (2-23)	
32	2	32	2	Setpoint 6 BINOUT (H) (2-23)	–CAP…CAP (2-20)
34	2	34	2	Setpoint 6 BINOUT (L) (2-23)	
36	2	36	2	Setpoint 7 BINOUT (H) (2-23)	–CAP…CAP (2-20)
38	2	38	2	Setpoint 7 BINOUT (L) (2-23)	

PAGE 15 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
DEF menu – Scale definition					
28	2	28	2	CAP (CAP high)	1…999999 (2-12)
30	2	30	2	(CAP Low)	
32	2	32	2	Digital division	1,2,5,10,20,50
34	2	34	2	DP	0…4
36	2	36	2	0-Track	0…6 (2-1) see table “2-A"
38	2	38	2	0-toP	**0:1.9%** 1:100%
40	2	40	2	0-Start	**0:OFF** 1:ON
42	2	42	2	UNIT	0…5 see table “2-N"
44	2	44	2	UNLIM	**0: -OVERLOAD** 1: -20d

PAGE 16 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
Option menu - Options					
28	2	28	2	Filter	0…15 (2-2) see table "2-B"
30	2	30	2	Band	0…5 (2-3) see table “2-C"
32	2	32	2	Period (settling time)	0…7 (2-21) see table “2-M"

PAGE 17 (read/write) REMOTE ONLY					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
Option menu - Options					
28	2	28	2	Tare LC	0:ON 1:OFF
30	2	30	2	Lang	0…5 (2-4) see table “2-D"
32	2	32	2	LOC	0…31 (2-5) see table “2-E"
34	2	34	2	PRT	0…255
36	2	36	2	Prt_t1	0:Off,1: Standard
38	2	38	2	t.ID	0…65535
40	2	40	2	BLIND	**0**…7: **OFF**,2,5,10,20,30,45,60 seconds

PAGE 18 (read/write) PROTECTED-REMOTE ONLY					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
CAL 1 menu – Calibration coefficient					
28	2	28	2	Zero Coefficient (H)	0…0x00FFFFFF
30	2	30	2	Zero Coefficient (L)	
32	2	32	2	SPAN Coefficient(H)	
34	2	34	2	SPAN Coefficient(L)	
36	2	36	2	LIN_C (H)	0…CAPx10 (2-19)
38	2	38	2	LIN_C (L)	
40	2	40	2	LIN_I (H)	0…CAPx10 (2-19)
42	2	42	2	LIN_I (L)	
44	2	32	2	LIN	0: OFF, 1: ON **(2-15)**, 2: RESET **(2-16)**

PAGE 19 (read/write) PROTECTED-REMOTE ONLY					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
CAL 2 menu – Numerical calibration					
28	2	28	2	LCAP (H)	
30	2	30	2	LCAP (L)	
32	2	32	2	Lno (Nº of load cells)	0…8
34	2	34	2	LSn (Average sensitivity)	0… 35000 (2-17)
36	2	36	2	Dead_Load (H)	–CAP…CAP (2-22)
38	2	38	2	Dead_Load (L)	

PAGE 20 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
APPLI menu – Active application					
28	2	28	2	APP	0:None; 1:CHECK

PAGE 21 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
APPLI menu – Checkweigher Application (1/2)					
28	2	27	1	START	0:KEY;1:INP; 2:KEY.INP;3:NET
30	2	30	2	TRIG (H)	1div. ≤ TRIG ≤ MAX
32	2	32	2	TRIG (L)	
34	2	34	2	BAND (H)	1div. ≤ BAND ≤ MAX
36	2	36	2	BAND (L)	
38	2	38	2	T_DEL	0.000 … 50.000 seconds
40	2	40	2	T_ACC	0.000 … 50.000 seconds
42	2	42	2	T_DIS	0.000 … 50.000 seconds
44	2	44	2	CANCEL	0:OFF; 1:ON;

PAGE 22 (read/write)					
Bytes input area		Bytes output area			
Address	Nº bytes	Address	Nº bytes	Description	Value ranges
APPLI menu - Checkweigher Application (2/2)					
28	2	28	2	TOTAL	0:OFF; 1:ON; 2:Store
30	2	30	2	PC	0:OFF;1:RS232;2:RS485; 3:RS232 y RS485
32	2	32	2	Filter	0…15 (2-2) see table "2-B"

1.5.1.5 Write / read section parameters tables

Table "2-A"	
Identification code for parameter: 0-Track	
Code	**Division**
0	OFF
1	**0.5d**
2	1d
3	2d
4	3d
5	4d
6	5d

Table "2-B"	
Identification code for parameter: Filter	
Code	**Filter**
0	OFF
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	15
9	**16**
10	17
11	18
12	19
13	20
14	22
15	24

Table "2-C"	
Identification code for parameter: Band	
Code	**Band (divisions)**
0	OFF
1	**0.5d**
2	1d
3	2d
4	5d
5	10d

Tabla "2-D"	
Identification code for parameter: Lang (language)	
Code	**Language**
0	**SPA**
1	POR
2	FRE
3	ENG
4	GER
5	CAT

Tabla "2-E"	
LOC parameter (keyboard block). Each bit has a lock function. Bit at '1' means function locked.	
Bit	**Function locked**
0	Whole keyboard
1	Print key
2	Tare key
3	Zero key
4	F key

Table "2-F"	
Identification code for parameter: Baudrate	
Code	**Baudrate**
0	4800
1	9600
2	19200
3	38400
4	57600
5	115200

Table "2-G"	
Identification code for parameter:Transmittion rate	
Code	**Rate (send/s)**
0	1
1	5
2	10
3	25
4	**50**
5	75
6	150
7	300
8	600

Table "2-H"	
Identification code for parameter:Termination	
Code	**Termination**
0	CR LF
1	CR
2	ETX
3	NONE

Table "2-I"	
Identification code for parameter: Type (digital output)	
Code	**Function**
0	OFF
1	GROSS
2	NET
3	P_REL
4	N_REL
5	P_PREL
6	N_PREL
7	ZERO
8	ZERO NET
9	SS
10	INRANG
11	NEG
12	TARE
13	PRINT
14	PC_CTRL

Table "2-J"	
Identification code for parameter: TRIP (digital output)	
Code	**TRIP**
0	HIGH
1	LOW
2	INBAND
3	OUTBAND

Table "2-M"	
Identification code for parameter: Period (time for settling time)	
Code	**Period (ms)**
0	25
1	50
2	100
3	150
4	200
5	250
6	**500**
7	1000

(2-1) It refers to the 7 possible values: OFF-0.5d,1d,2d,3d,4d,5d.
(2-2) It refers to the 16 possible values:OFF-2-4-6-8-10-12-14-15-16-17-18-19-20-22-24.
(2-3) It refers to the 6 possible values:OFF-0.5d-1d-2d-5d-10d.
(2-4) It refers to the 6 possible values:SPA,POR,FRE,ENG,GER,CAT.
(2-5) Each bit of this variable have a lock function. See table “2-E".
(2-6) It refers to the 14 possible values 0…13 that corresponds to format F1 to F15 (value 13 = F15, F14 not implemented).
(2-7) It refers to the 6 possible values of baudrate: 4800,9600,19200,38400,57600,115200.
(2-8) It refers to the 9 possible values: 1,5,10,25,50,75,150,300,600.
(2-9) It refers to the 4 possible values: CRLF,CR,ETX,NONE.
(2-10) It refers to the 15 possible values: see table “2-I".
(2-11) It refers to the 4 possible values: HIGH, LOW, INBAND, OUTBAND.
(2-12) Capacity can not exceed 999999. Digital division combined with decimal point can not exceed 100000 divisions.
(2-13) This value must be multiple of the digital division without taking into account the decimal point (if exists). CAP is the scale capacity. This value never can be lower than -99999.
(2-15) When writing value 1 on the LIN register; it calculates and enables the linearity correction at the same time that saves both parameters LIN_C y LIN_I in the E2PROM.
(2-16) When writing value 2 in the LIN (RESET) parameter, it makes a reset of the linearity and parameter LIN turns automatically to 0 (OFF). The value is saved in the E2PROM.
(2-17) This value is the sensitivity in mV/V multiplied per 10000. For example value 20500 indicates a sensitivity of 2,05 mV/V.
(2-19) This value is introduced with the precision per 10 (without taking into account the decimal point). Maximum capacity value x 10. Per example CAP=6000 maximum value = 60000.
(2-20) This value must be multiple of the digital division without taking into account the decimal point (if exist). Never can be lower than -99999.
(2-21) It refers to the 8 possible values for settling time 25,50,100,150,200,250,500,1000.
(2-22) This value is programmed without taking into account the decimal point. Per example to introduce 2.500 we must send 2500.
(2-23) These set points are not saved in the non-volatile memory.
(2-24) When setting register 41150 (*Binary mode status*) to ‘1’ the digital outputs start working in binary mode. Annulling the D_OUT configuration.
(2-25) An empty register can be read or write but his content doesn’t affect the program. Anyhow is recommended to not write in those registers because they can be used in future applications.

*1.5.1.6 **Only read paged Section***

This section is formed by pages 100 and 101 and can be only read.

PAGE 100 (Only read)			
Address	**Nº bytes**	**Description**	**Value range**
Tare value + generic indicator data			
28	2	Tare (High)	
30	2	Tare (Low)	
32	1	Software version "A"	Software version "ABCDEFGH" Example:"1.00204" H digit is always 0x00
33	1	Software version "B"	
34	1	Software version "C"	
35	1	Software version "D"	
36	1	Software version "E"	
37	1	Software version "F"	
38	1	Software version "G"	
39	1	Software version "H"	
40	2	Indicator serial number (High)	
42	2	Indicator serial number (Low)	

PAGE 101 (Only read)			
Address	**Nº bytes**	**Description**	**Value range**
Checkweigher application data			
28	2	Last weighing (High) (3-3)	
30	2	Last weighing (Low)	
32	2	Weight status read	0: Empty (There is no weighings) 1: New weighing 2: Weighing read 3: Error during weighing
34	2	Present Weight status	0: OFF (3-1) 1: Rest 2: Phase 1 (Wait) 3: Phase 2 (Read) 4: Phase 3 (Display) 5: Error
36	2	Accumulation status	0: Disabled (3-2) 1: Closed 2: Opened
38	2	Number of Weighings	
40	2	Total (High)	
42	2	Total (Low)	

PAGE 102 (Only read)			
Address	**Nº bytes**	**Description**	**Value range**
Checkweigher application data			
28	2	Last weighing x10 (High) (3-4)	
30	2	Last weighing x10 (Low)	
32	2	Weight status read	0: Empty (There is no weighings) 1: New weighing 2: Weighing read 3: Error during weighing
34	2	Present Weight status	0: OFF (3-1) 1: Rest 2: Phase 1 (Wait) 3: Phase 2 (Read) 4: Phase 3 (Display) 5: Error
36	2	Accumulation status	0: Disabled (3-2) 1: Closed 2: Opened

(3-1) Status weighing shows OFF when the indicator is not configured in Check-weigher mode. *Error* status is shown when there is a failure on the weighing signal during reading time (phase 2).
(3-2) Accumulation status is always 0 (disabled) if the parameter TOTAL of the checkweigher application is OFF.
(3-3) It's the last read of the Check-weigher mode. It's necessary to read the weighing status at the same time that the weighing in order to know if the weighing is valid.
(3-4) It's the last read of the Check-weigher mode with resolution x10. It's necessary to read the weighing status (register P102/32) at the same time that the weighing x10 in order to know if the weighing is valid.

PAGE 199 (Only read)			
Address	**Nº bytes**	**Description**	**Value range**
Checkweigher application data			
28	2	Data format version	See table "3-G"
30	2	Indicator status	See table "3-F"
32	2	Hardware version	See table "3-H"
34	2	Number of calibrations	
36	2	software calibration seal status	0: Opened 1: Closed (protected)

Table "3-G"	
Parameter version	
Value	**Meaning**
0x0101	First version parameters PROFIBUS. Ver. SW SWIFT 1.0020
0x0102	Change on filter (Table "2-B"). SW.Ver.1.0040

Table "3-F"			
Bits used in Mode Register			
Bit	**Description**	**Meaning**	
		0	1
0	Remote mode	No	Yes
1	Present position of the calibration switch	Unprotected	Protected
2	Calibration mode*	Unprotected	Protected
3..15	Reserved (do not use)		

* The calibration mode is determined by the position of the calibration switch in the moment that we enter in the SETUP mode only if the introduced PIN is correct. If the switch position is changed when we are in the SETUP mode the calibration mode doesn't change.

Table "3-H"		
Bits used in the hardware registration		
Bit	**Description**	**Meaning**
0	RS485 terminator	0: Not in built 1: In built
1	Analog output	0: Not in built 1: In built
2...6	Field buses	0: Anyone 1: PROFIBUS 2: PROFINET 5: ETHERNET/IP
7	Device Tipe	0: Stndard 1: COM Version (without keyboard and display)
8...15	Reserved	All to zero