

USER'S MANUAL for TPAC020 01 series




 +39 011 9664616

ME7017_01
07/11

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1.0 OVERVIEW

TPAC020 01 is an operator panel for process control.

1.1 REFERENCE USER'S MANUALS

M7000 tutorial for TPAC suite usage.

1.2 TECHNICAL CHARACTERISTICS

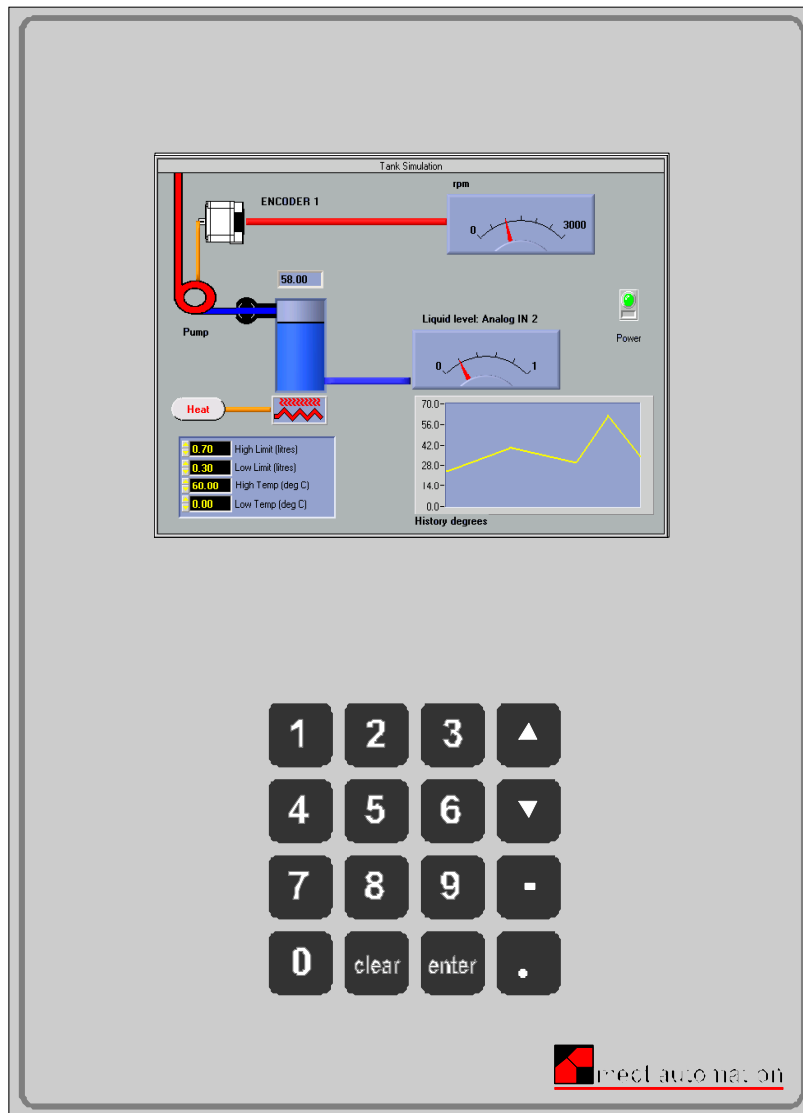
Table 1

Dimensions	Panel: 210mm x 260mm
	Depth: 75mm
	Mounting plate: 185mm x 238mm
Weight	2600 gr
IP protection	IP65 front
	IP20 back
Mounting	By bolts
Analogue input	4÷20 mA 12 bit (opz. 0÷10V)
Current input impedance	20 Ω (optionally 0÷10V = 1M)
Analogue output	4÷20 mA 12 bit
Max load for current output	400 Ω
Digital inputs (encoder)	4 bi-directional encoder inputs PNP optocoupled
	Max input frequency: 40KHz
Power supply encoder	24Vdc iso (power supply I/O)
Digital inputs	24+24 PNP inputs optocoupled Max frequency: 500Hz @ 1ms PLC cycle time
Digital outputs	16+16 outputs PNP optocoupled Frequency max 500Hz @ 1ms PLC cycle time Max current for each output 500mA @ 24Vdc
Power supply panel	24Vdc \pm 15% 300mA
Power supply I/O	24Vdc \pm 15% (optocoupled respect to main power supply)
Monitor	Type 256 colors TFT LCD
	Resolution 320 x 240
	With touch screen
Keyboard	16 keys

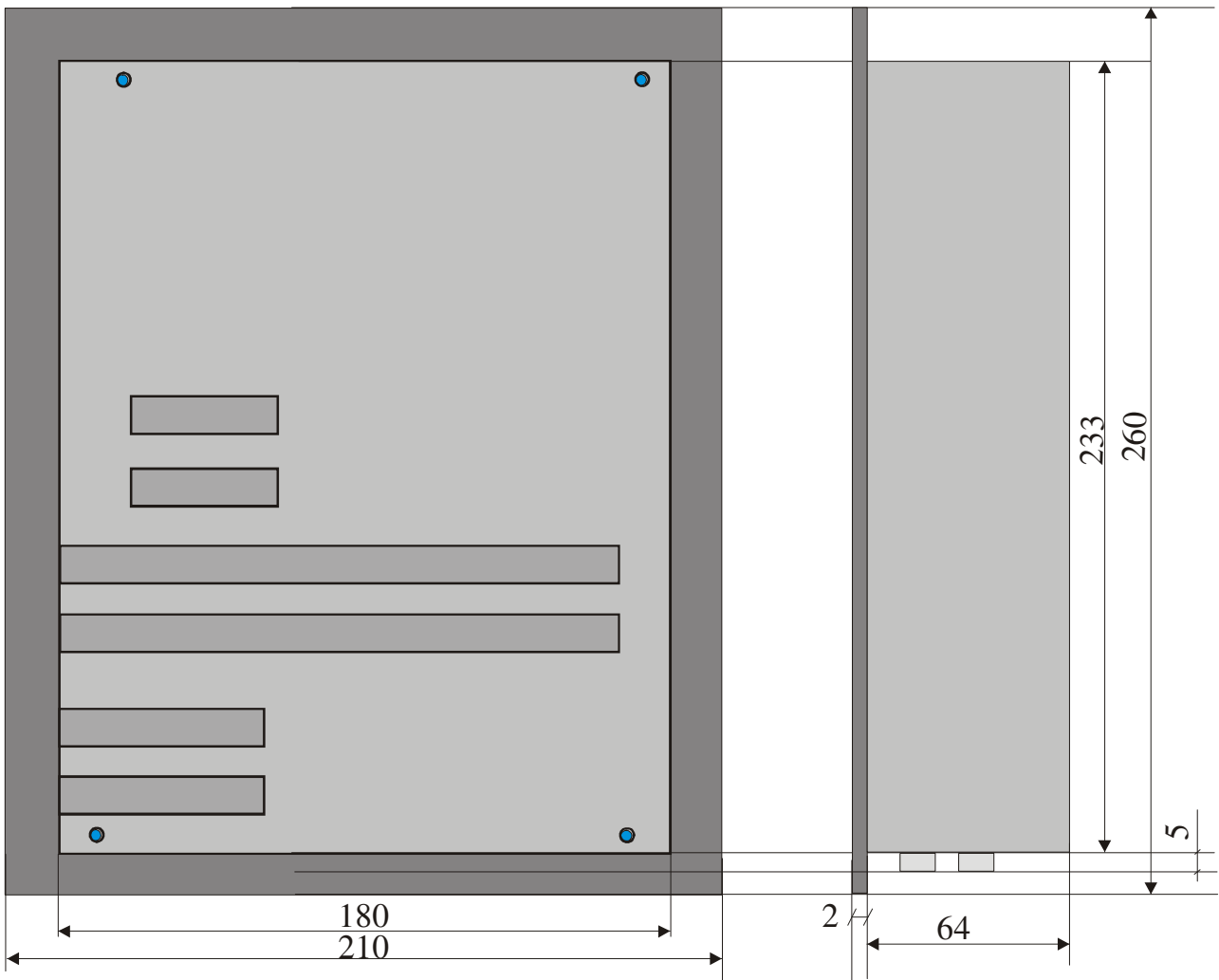
CANOpen	2 optocoupled channels
	Bit rate: 1Mbit/sec
	Cycle time: 5msec
USB A	1.0 compliance
Ethernet	Bit rate: 10Mbit/sec
USART	full duplex RS485
	Max baud rate: 115Kbit/sec

1.3 CONNECTION AND KEYBOARD DESCRIPTIONS

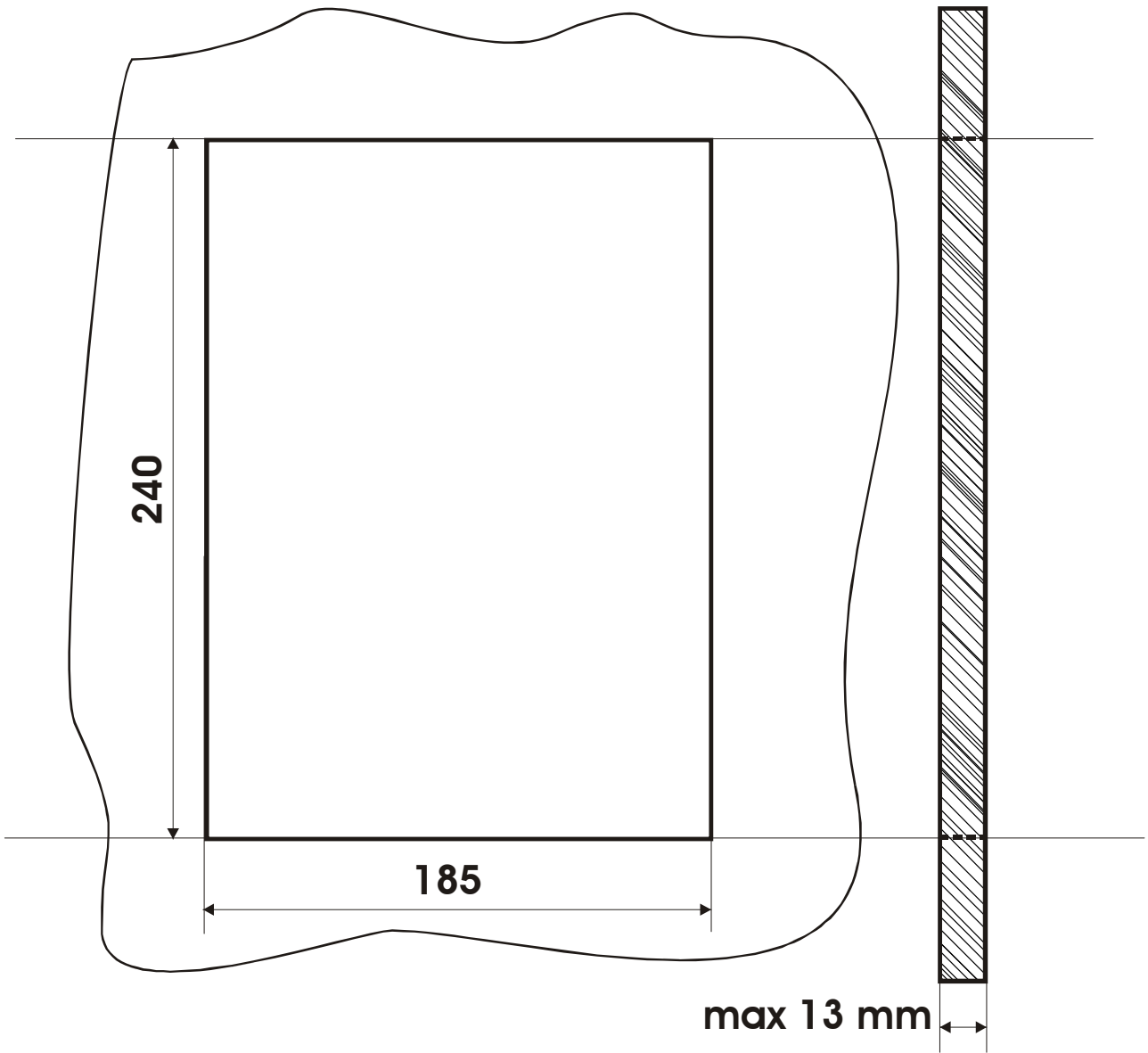
1.3.1 keyboard description



1.3.2 mechanical dimensions



1.3.3 mounting plate



1.3.4 terminal board description

I/O connections

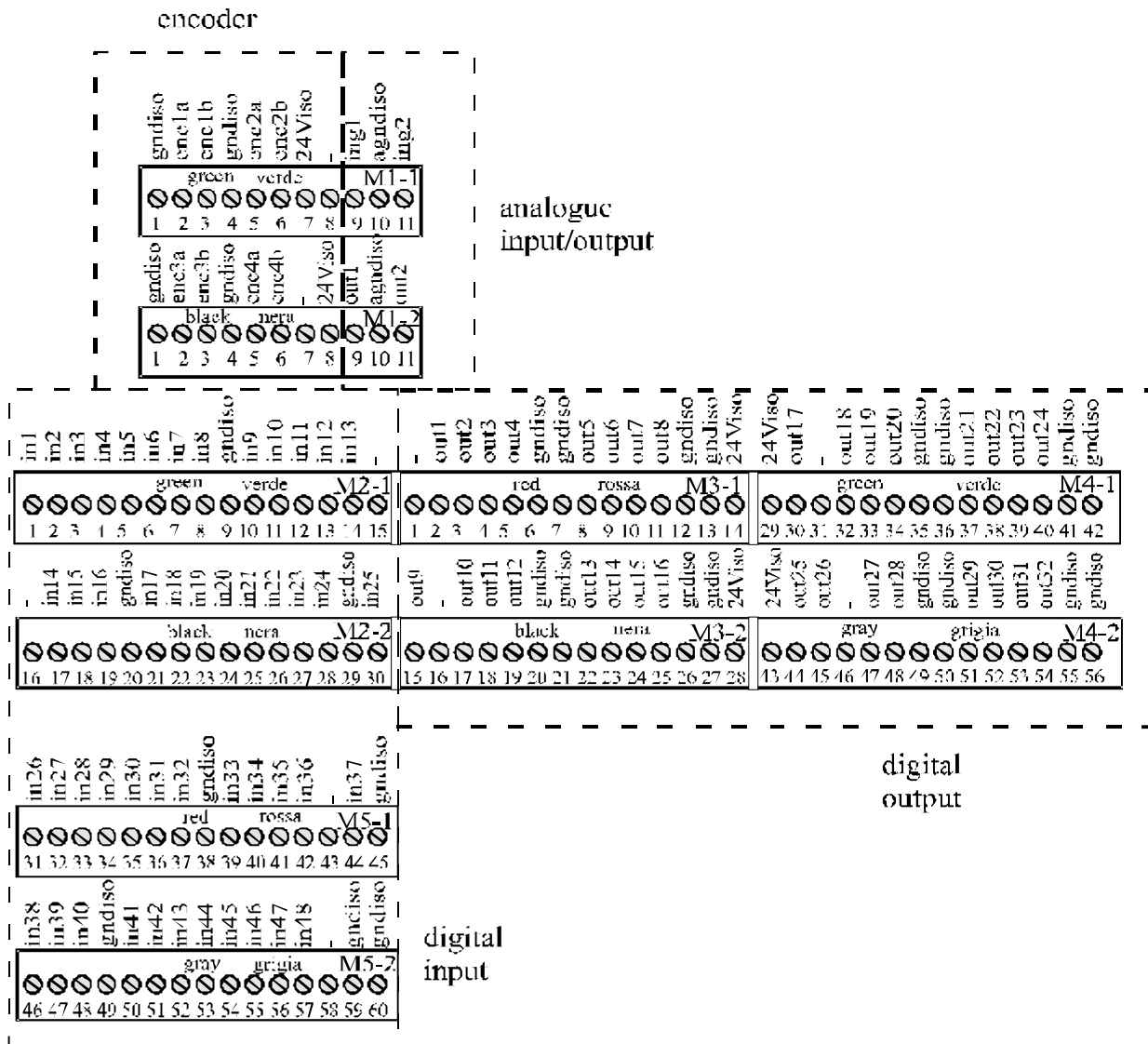


Table 2

Terminal name	Terminal number	funtion
M1-1 GREEN	1	Gnd iso
M1-1 GREEN	2	Encoder 1 Channel a
M1-1 GREEN	3	Encoder 1 Channel b
M1-1 GREEN	4	Gnd iso
M1-1 GREEN	5	Encoder 2 Channel a
M1-1 GREEN	6	Encoder 2 Channel b
M1-1 GREEN	7	24Viso
M1-1 GREEN	8	-
M1-1 GREEN	9	Analog input 1 4-20mA
M1-1 GREEN	10	Agnd iso
M1-1 GREEN	11	Analog input 2 4-20mA
M1-2 BLACK	1	Gnd iso
M1-2 BLACK	2	Encoder 3 Channel a
M1-2 BLACK	3	Encoder 3 Channel b
M1-2 BLACK	4	Gnd iso

TPAC020

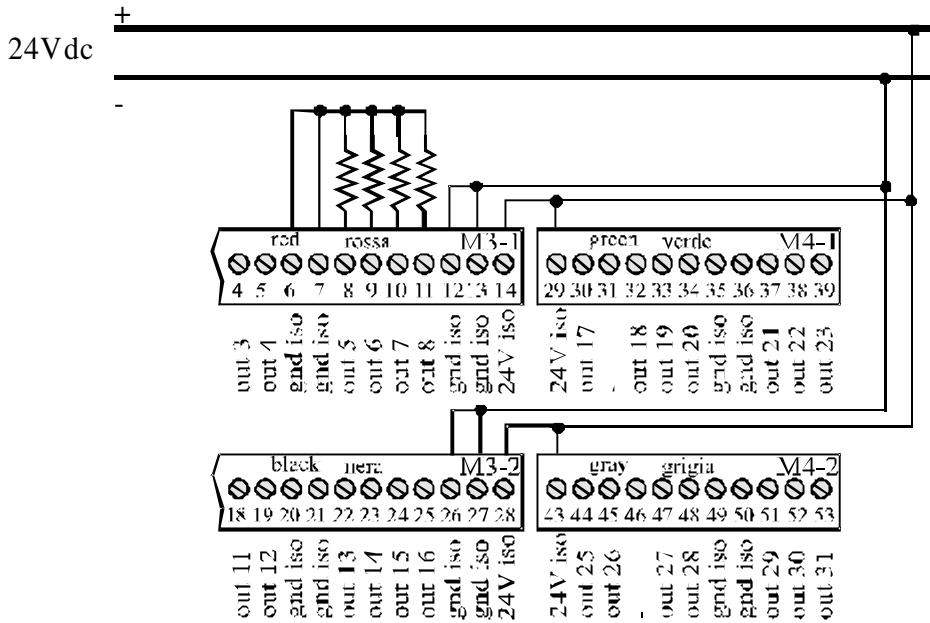
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M1-2 BLACK	5	Encoder 4 Channel a
M1-2 BLACK	6	Encoder 4 Channel b
M1-2 BLACK	7	-
M1-2 BLACK	8	24Viso
M1-2 BLACK	9	Analogue output 1 4-20mA
M1-2 BLACK	10	Agnd iso
M1-2 BLACK	11	Analogue output 2 4-20mA
M2-1 GREEN	1	Digital input 1 /interrupt 1
M2-1 GREEN	2	Digital input 2 /interrupt 2
M2-1 GREEN	3	Digital input 3
M2-1 GREEN	4	Digital input 4
M2-1 GREEN	5	Digital input 5
M2-1 GREEN	6	Digital input 6
M2-1 GREEN	7	Digital input 7
M2-1 GREEN	8	Digital input 8
M2-1 GREEN	9	Gnd iso
M2-1 GREEN	10	Digital input 9
M2-1 GREEN	11	Digital input 10
M2-1 GREEN	12	Digital input 11
M2-1 GREEN	13	Digital input 12
M2-1 GREEN	14	Digital input 13
M2-1 GREEN	15	-
M2-2 BLACK	16	-
M2-2 BLACK	17	Digital input 14
M2-2 BLACK	18	Digital input 15
M2-2 BLACK	19	Digital input 16
M2-2 BLACK	20	Gnd iso
M2-2 BLACK	21	Digital input 17
M2-2 BLACK	22	Digital input 18
M2-2 BLACK	23	Digital input 19
M2-2 BLACK	24	Digital input 20
M2-2 BLACK	25	Digital input 21
M2-2 BLACK	26	Digital input 22
M2-2 BLACK	27	Digital input 23
M2-2 BLACK	28	Digital input 24
M2-2 BLACK	29	Gnd iso
M2-2 BLACK	30	Digital input 25
M5-1 RED	31	Digital input 26
M5-1 RED	32	Digital input 27
M5-1 RED	33	Digital input 28
M5-1 RED	34	Digital input 29
M5-1 RED	35	Digital input 30
M5-1 RED	36	Digital input 31
M5-1 RED	37	Digital input 32
M5-1 RED	38	Gnd iso
M5-1 RED	39	Digital input 33
M5-1 RED	40	Digital input 34
M5-1 RED	41	Digital input 35
M5-1 RED	42	Digital input 36
M5-1 RED	43	-
M5-1 RED	44	Digital input 37
M5-1 RED	45	Gnd iso
M5-2 GRAY	46	Digital input 38

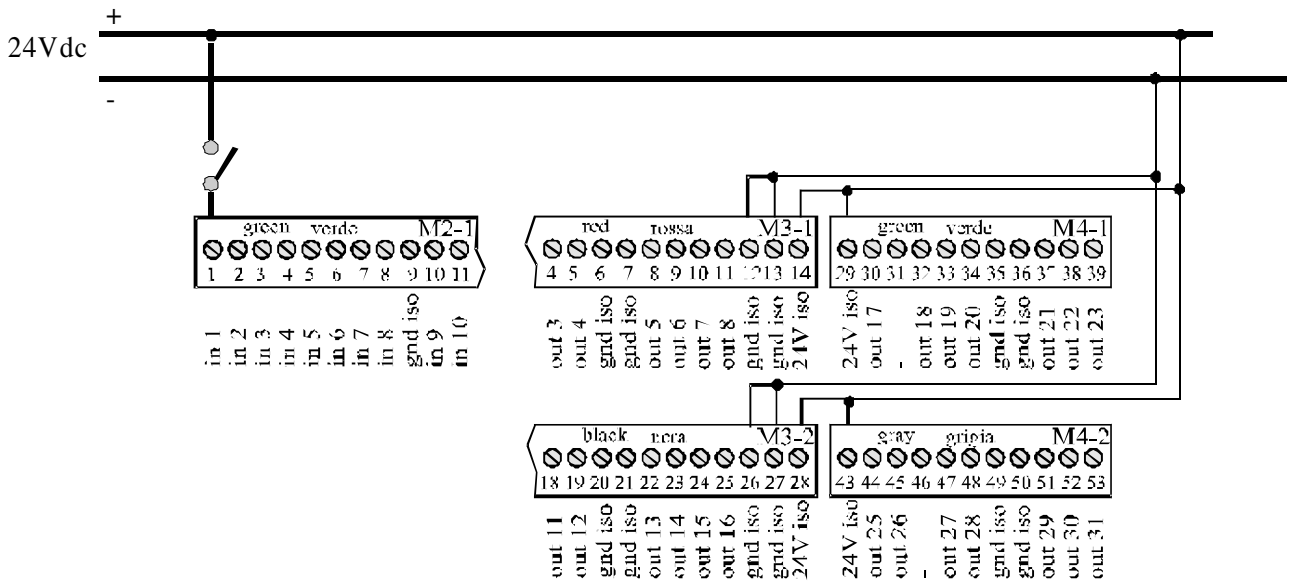
M5-2 GRAY	47	Digital input 39
M5-2 GRAY	48	Digital input 40
M5-2 GRAY	49	Gnd iso
M5-2 GRAY	50	Digital input 41
M5-2 GRAY	51	Digital input 42
M5-2 GRAY	52	Digital input 43
M5-2 GRAY	53	Digital input 44
M5-2 GRAY	54	Digital input 45
M5-2 GRAY	55	Digital input 46
M5-2 GRAY	56	Digital input 47
M5-2 GRAY	57	Digital input 48
M5-2 GRAY	58	-
M5-2 GRAY	59	Gnd iso
M5-2 GRAY	60	Gnd iso
M3-1 RED	1	-
M3-1 RED	2	Digital output 1
M3-1 RED	3	Digital output 2
M3-1 RED	4	Digital output 3
M3-1 RED	5	Digital output 4
M3-1 RED	6	Gnd iso
M3-1 RED	7	Gnd iso
M3-1 RED	8	Digital output 5
M3-1 RED	9	Digital output 6
M3-1 RED	10	Digital output 7
M3-1 RED	11	Digital output 8
M3-1 RED	12	Gnd iso (power supply)
M3-1 RED	13	Gnd iso (power supply)
M3-1 RED	14	24Viso (power supply)
M3-2 BLACK	15	Digital output 9
M3-2 BLACK	16	-
M3-2 BLACK	17	Digital output 10
M3-2 BLACK	18	Digital output 11
M3-2 BLACK	19	Digital output 12
M3-2 BLACK	20	Gnd iso
M3-2 BLACK	21	Gnd iso
M3-2 BLACK	22	Digital output 13
M3-2 BLACK	23	Digital output 14
M3-2 BLACK	24	Digital output 15
M3-2 BLACK	25	Digital output 16
M3-2 BLACK	26	Gnd iso (power supply)
M3-2 BLACK	27	Gnd iso (power supply)
M3-2 BLACK	28	24Viso (power supply)
M4-1 GREEN	29	24Viso (power supply)
M4-1 GREEN	30	Digital output 17
M4-1 GREEN	31	-
M4-1 GREEN	32	Digital output 18
M4-1 GREEN	33	Digital output 19
M4-1 GREEN	34	Digital output 20
M4-1 GREEN	35	Gnd iso
M4-1 GREEN	36	Gnd iso
M4-1 GREEN	37	Digital output 21
M4-1 GREEN	38	Digital output 22
M4-1 GREEN	39	Digital output 23

M4-1 GREEN	40	Digital output 24
M4-1 GREEN	41	Gnd iso (power supply)
M4-1 GREEN	42	Gnd iso (power supply)
M4-2 GRAY	43	24V iso (power supply)
M4-2 GRAY	44	Digital output 25
M4-2 GRAY	45	Digital output 26
M4-2 GRAY	46	-
M4-2 GRAY	47	Digital output 27
M4-2 GRAY	48	Digital output 28
M4-2 GRAY	49	Gnd iso
M4-2 GRAY	50	Gnd iso
M4-2 GRAY	51	Digital output 29
M4-2 GRAY	52	Digital output 30
M4-2 GRAY	53	Digital output 31
M4-2 GRAY	54	Digital output 32
M4-2 GRAY	55	Gnd iso
M4-2 GRAY	56	Gnd iso

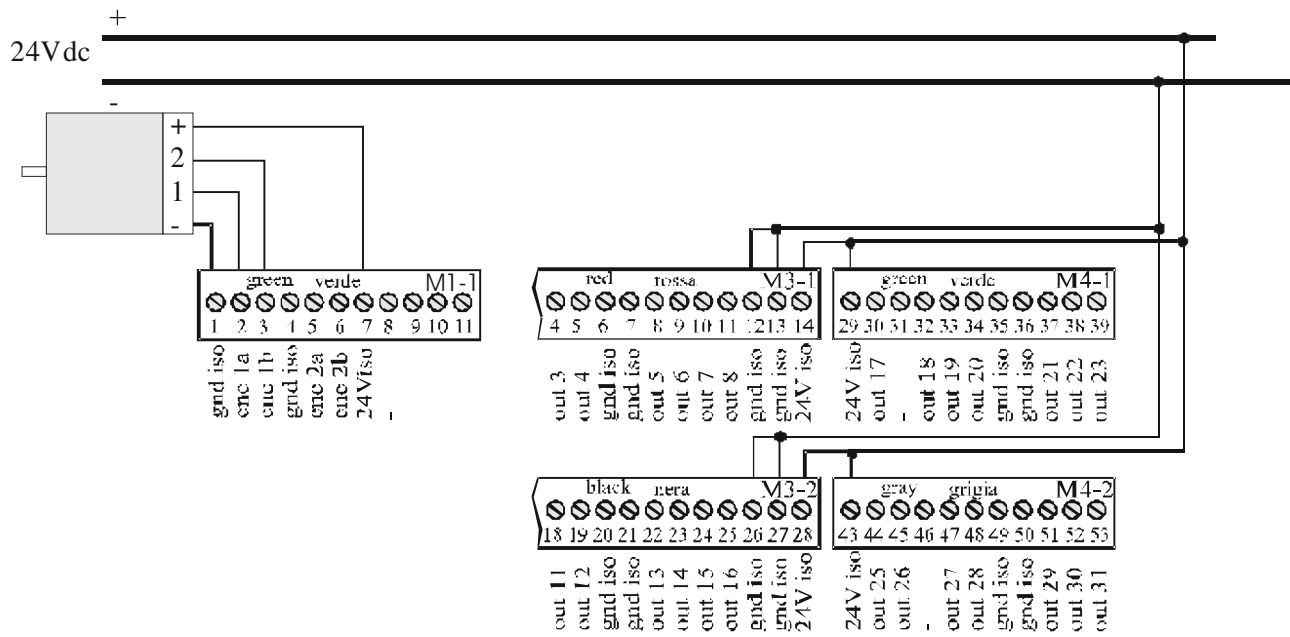
1.3.5 output wiring



1.3.6 input wiring



1.3.7 encoder wiring



1.3.8 field bus connections

Panel connectors: low side

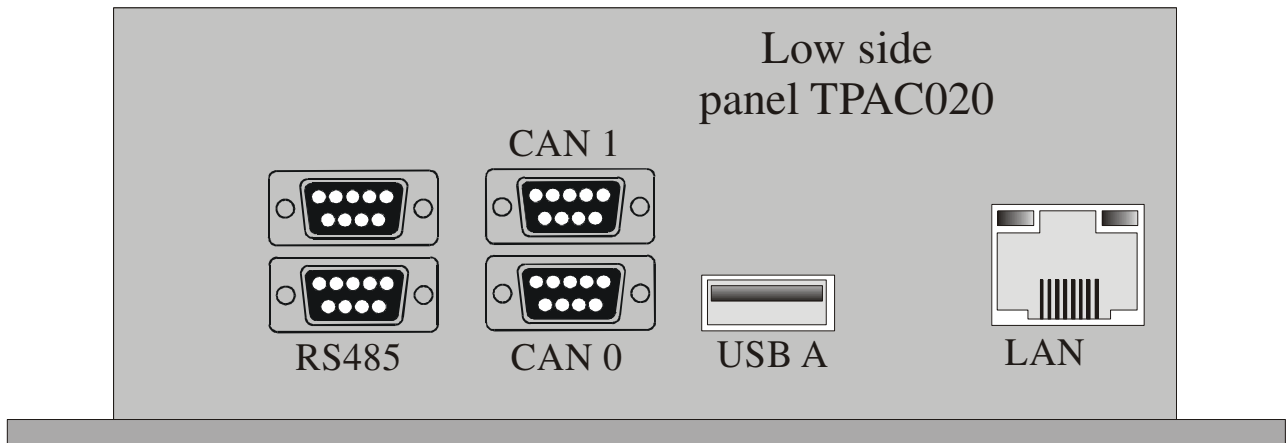
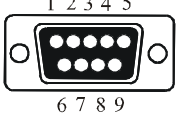
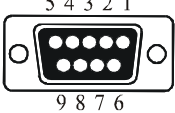
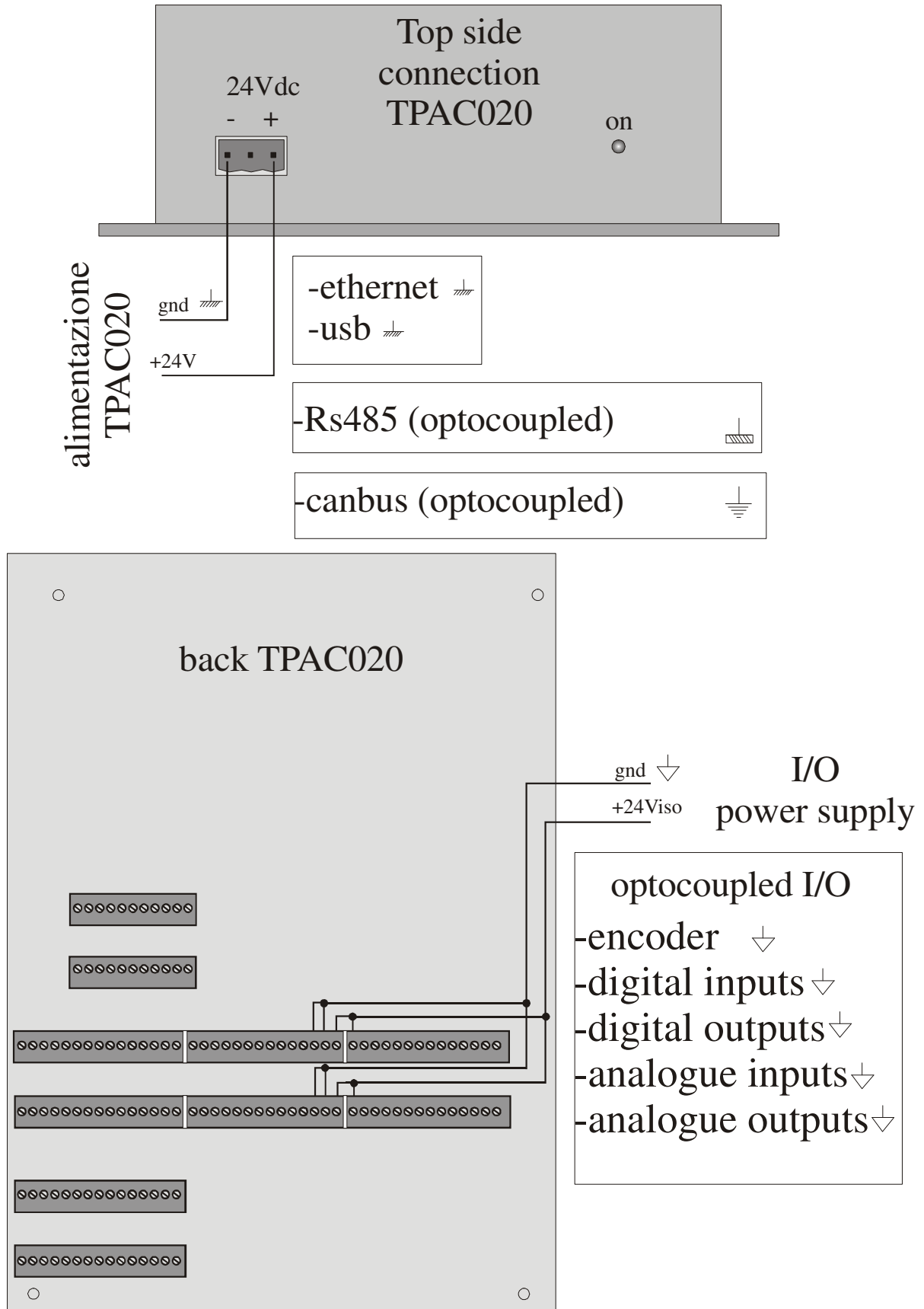


Table 3

	CAN		RS485 modbus
9 poli maschio 	1. - 2. CAN L 3. gnd iso2 4. - 5. - 6. - 7. CAN H 8. - 9. -	9 poli femmina 	1. GND 2.- 3.- 4. RX- 5. TX- 6. - 7. - 8. RX+ 9. TX+

1.3.9 TPAC020 power supply





2.0 INSTALLATION NOTES

Not any particular note is needed to connect TPAC020. For software installation, please follow the tutorial instructions.

3.0 MEMORY VARIABLES

Space	Block. Index	Name	Byte	Lenght	Description
MEMO	0	UserArea	1	262144	User Available Variable
MEMO	1.0	DATE_YY	2	1	Year
MEMO	1.1	DATE_MM	2	1	Month
MEMO	1.2	DATE_DD	2	1	Day
MEMO	1.3	TIME_HH	2	1	Hour
MEMO	1.4	TIME_MM	2	1	Minute
MEMO	1.5	TIME_SS	2	1	Second
MEMO	2.0	Buzzer	4	1	Set buzzer ON time expressed in ms, when 0 the buzzer is inactive.
MEMO	3.0	PLC0 Cycle	4	5	PLC0Time Cycle
MEMO	3.1	PLC1 Cycle			PLC1 Time Cycle
MEMO	3.2	PLC2 Cycle			PLC2 Time Cycle
MEMO	From 4.0 to 4.128	Timers	4	128	Set timer active time expressed in ms, if 0 timer is inactive. (timer resolution 10ms)
MEMO	Da 5.0 a 5.47	di_delays	1	48	Set delay time on input, If 0 there's no delay.
MEMO	6.0	sysTimer	4	1	System Timer 1ms
MEMO	7.0	ENAB_KEY_BEEP	4	1	Enable a beep when a key down event on the hardware keyboard is detected.
MEMO	7.1	ENAB_TOUCH_BEEP	4	1	Enable a beep when a key down event on the touch screen is detected.
MEMO	8.0	PRESS_OK	4	1	The variable is 1 if the touch screen is pressed.
MEMO	8.1	TOUCH_X	4	1	X Coordinate for the currently pressed point on the touch screen.

Space	Block. Index	Name	Byte	Lenght	Description
MEMO	8.2	TOUCH_Y	4	1	Y Coordinate for the currently pressed point on the touch screen.
MEMO	9.0	PLCKeyboard	4	1	ASCII code for the currently selected key on the keyboard.
MEMO	10.0	PLC_MECT_enq	4	1	MECT protocol reading returned value variable.
MEMO	11.0	FILE_READ	4	1	Text File Pointer
MEMO	12.0	TIMERS_FLANG	4	128	Timers Retrigger
MEMO	13.0	RemoteArea	1	8192	User Remote Variables
MEMO	30.0	USBstatus	4	6	USBstatus[i= 0]: Number of the available usb port, from 1 to 4; USBstatus[i= 1,2,3,4]: 0 no device connected; >= 97 usb memory device connected on port i; USBstatus[i= 5]: ≠ 0 error, USBstatus array content is not valid.
MEMO	31.0	USBfeedback	4	2	USBfeedback[i = 0] : 0 – usb subsystem ready for operation among files; 1 – usb subsystem busy; USBfeedback[i= 1] : 0 - file operations ok 1- error in file operations, the content of the usb device may be damaged.

Space	Block. Index	Name	Byte	Lenght	Description
MEMO	32.0	MODBUSstatus	4	3	<p>MODBUSstatus[i = 0]: Status of the MODBUS subsystem</p> <ul style="list-style-type: none"> - 0 READY - 1 BUSY <p>MODBUSstatus[i = 1]: data length or high level error code</p> <ul style="list-style-type: none"> - >0 lenght of the received data excluding CRC bytes - -1 internal error or port failure - -2 timeout - -3 received a valid but unexpected frame - -4 modbus exception error (in this case the exception code is returned in MODBUSstatus[2]) - -5 invalid request - -6 broadcast request not supported - -7 protocol init failed <p>MODBUSstatus[i = 2]: modbus exception error code if any</p>
MEMO	33.0	MODBUSdata	4	257	<p>For write modbus functions it's filled with the data to be written according to the write function requirement. For read modbus function contains the received data according to the read function requirement.</p>
MEMO	97	SysLangID	4	1	System Language
MEMO	Da 98.0 a 98.253	HmiRitenVars	4	254	HMI Retentive Variables

Space	Block. Index	Name	Byte	Lenght	Description
MEMO	Da 99.0 a 99.767	PlcRitenVars	4	768	PLC Retentive Variables
MEMO	999.0	SDOStatus	4	1	SDO last operation status
MEMO	999.1	SDOData	4	1	Returned Value from Reading
INP	0	DigInp	1	48	Digital Input
INP	1	DigOutSC	1	16	Digital Output Control
OUT	0	DigOut	1	32	Digital Output
INP	10	AnaInp	2	2	Analog Input. Value: 0- 4095
OUT	10	AnaOut	2	2	Analog Output. Value:0- 4095
INP	20	Enc	4	4	val0, val1, val2, val3
OUT	20	Enc	4	8	mode0, init0, mode1, init1, mode2, init2, mode3, init3
INP	100	Inp Bitarray	4	1000	CANOpen input bit variables
OUT	101	Out Bitarray	4	1000	CANOpen Channel 0 output bit variables
INP	102	InpByteaarray	4	1000	CANOpen Channel 0 input byte variables
OUT	103	OutBytearray	4	1000	CANOpen Channel 0 output byte variables
INP	104	InpWordarray	4	1000	CANOpen Channel 0 input word variables
OUT	105	OutWordarray	4	1000	CANOpen Channel 0 output word variables
INP	106	InpDwordarray	4	1000	CANOpen Channel 0 input double word variables
OUT	107	OutDwordarray	4	1000	CANOpen Channel 0 output double word variables
INP	200	InpBitarray	4	1000	CANOpen Channel 1 input bit variables
OUT	201	OutBitarray	4	1000	CANOpen Channel 1 output bit variables
INP	202	InpByteaarray	4	1000	CANOpen Channel 1 input byte variables
OUT	203	OutBytearray	4	1000	CANOpen Channel 1 output byte variables
INP	204	InpWordarray	4	1000	CANOpen Channel 1 input word variables

Space	Block. Index	Name	Byte	Lenght	Description
OUT	205	OutWordarray	4	1000	CANOpen Channel 1 output word variables
INP	206	InpDwordarray	4	1000	CANOpen Channel 1 input double word variables
OUT	207	OutDwordarray	4	1000	CANOpen Channel 1 output double word variables

3.1 SYSTEM VARIABLES

Name	Description	Note
TIME_HH	System Time	TIME VARIABLES
TIME_MM	Minutes	
TIME_SS	Seconds	
DATE_YY	Year	DATE VARIABLES
DATE_MM	Month	
DATE_DD	Day	
SysTimer	1ms tic	
BUZZER		
SysData	User Space Data	256k Byte memory variables allowable
PLC_0	PLC0 Time Cycle	
CAN_0	CAN0 Time Cycle	
CAN_1	CAN1 Time Cycle	
DELAY_DI	Delayed Input	Set the delay for each selected input
Retentive	Retentive Variables	4k Bytes retentive Variables

3.2 Input/Output VARIABLES

Name	Group
DO_1.. DO_31	DIGITAL OUTPUTS
DI_1..DI_48	DIGITAL INPUTS
ANALOG_INPUT_1	12 BIT ANALOG INPUTS
ANALOG_INPUT_2	
ANALOG_OUTPUT_1	12 BIT ANALOG OUTPUTS
ANALOG_OUTPUT_2	
ENC_COUNT_1.. ENC_COUNT_4	CURRENT COUNTER VALUE on 28 BIT

<p>ENC_MODE_1.. ENC_MODE_4</p>	<p>COUNTER MODE SETTINGS: 0 : encoder/counter disabled 1 : bi-directional encoder, up on A rising edge 2 : bi-directional encoder, down on A falling edge 3 : bi-directional encoder, up on B rising edge 4 : bi-directional encoder, down on B falling edge 5 : bi-directional encoder up on A edges 6 : bi-directional encoder, up on B edges 7 : bi-directional encoder, up on A and B edges 8 : encoder/counter disabled 9 : monodirectional counter, up on A rising edge 10: monodirectional counter, up on A falling edge 11: monodirectional counter, up on A edge 12: monodirectional counter, down on A rising edge 13: monodirectional counter, down on A falling edge 14: monodirectional counter, down on A edges 15: encoder/counter disabled</p>
<p>ENC_PRESET_1.. ENC_PRESET_4</p>	<p>SET COUNTER VALUE on 28 BIT</p>

3.3 RECEIPTS VARIABLES

Variable Name	Dimension	Description
ric_name	18	Receipt name
description	190	Receipt Description
new_ric	1	New Receipt Creation Flag
change	1	Modified Receipt Parameter Flag
start	1	Service Variable
max_param	1	Receipt Parameter
dummy	1	Service Variable