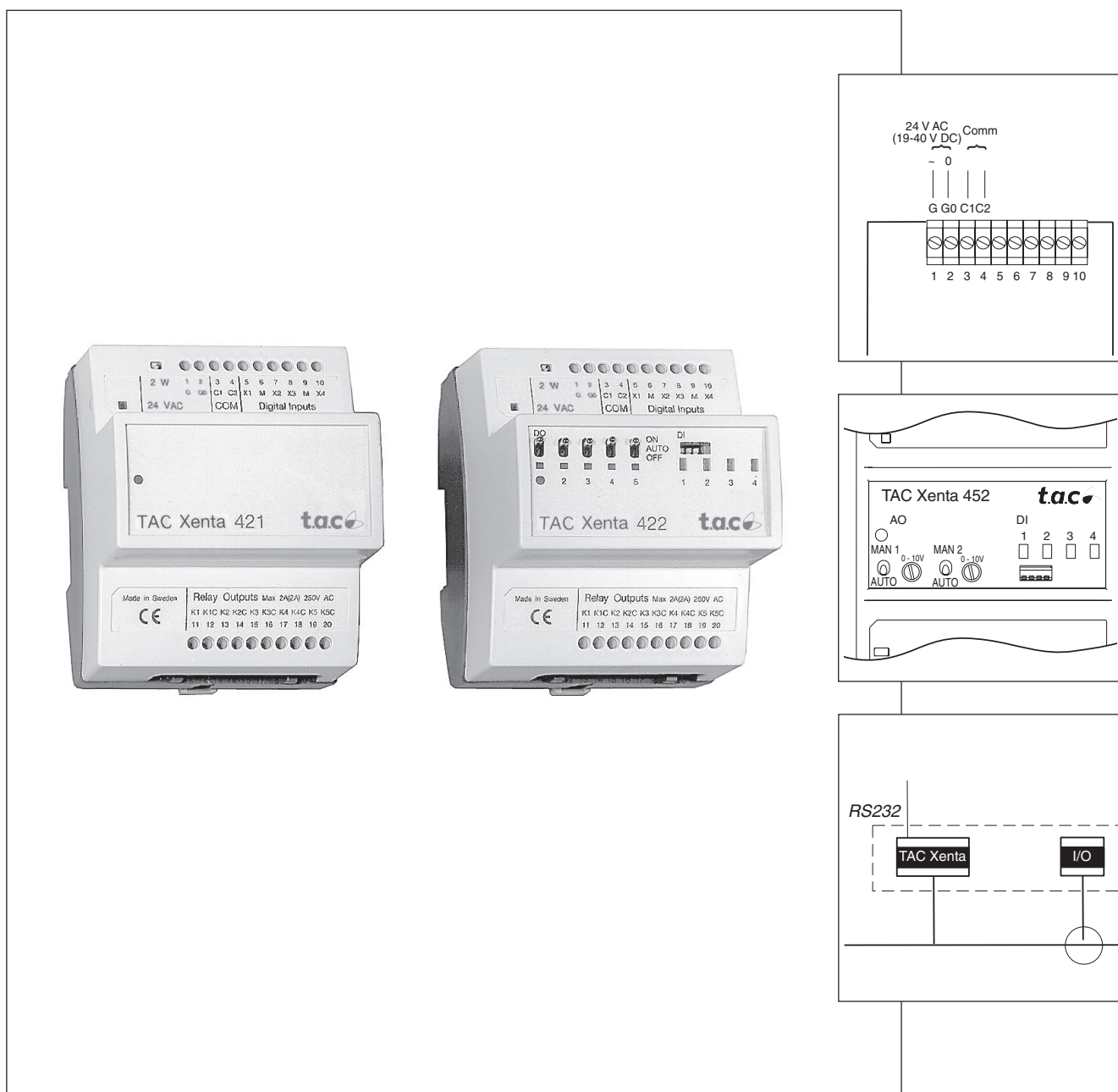


TAC Xenta[®] 400

I/O modules



Foreword

This handbook describes the I/O modules of the TAC Xenta 400 family.

The descriptions of these were previously included in the manual “TAC Xenta 400 Handbook”, but as the handbooks for the TAC Xenta 300 and 401 were merged, the sections describing the I/O modules were assembled in a separate manual. The purpose of this is to simplify adding new modules to the new manual.

In edition -1, the units TAC Xenta 471 Analogue input module and TAC Xenta 491/492 Analogue output modules were added.

In edition -2, technical data (ambient temperature) and part numbers for the units TAC Xenta 421XT and 422XT were added.

List of revisions

<i>Part no.</i>	<i>Comment</i>	<i>Author</i>	<i>Date</i>
0-004-7771-0	Original edition.	KW	1999-11-20
0-004-7771-1	TAC Xenta 471 and 491/492 added.	KW	2000-09-01
0-004-7771-2	Operation temp. for Operation TAC Xenta 421XT and 422XT added.	MF	2003-06-25
	Part nos. for TAC Xenta 421XT and 422XT added	MF	2003-06-25

TAC Xenta® 400 I/O modules

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This manual contains a total of 36 pages.

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1 Introduction

1.1 TAC Xenta 400 I/O modules

The TAC Xenta 400 is a series of input/output modules designed to be connected to the TAC Xenta 300 or 401 type controllers.

The installation procedures and technical data are similar between the different modules.

Please note!



The TAC Xenta 400 I/O modules and the other products of the TAC Xenta family must not be used for any other purpose than those for which they were designed.

Installation, connection and repair may only be performed by authorized personnel.

1.2 This manual

The manual has the following contents:

Chapter 2

This chapter contains general information about the TAC Xenta 300 and 401 controllers and the associated I/O modules.

Chapter 3

This chapter contains technical information about the TAC Xenta 400 I/O modules.

Chapter 4

This chapter contains information about how to install the I/O modules of the TAC Xenta 400 series.

At the end of the manual there is a reply form, which you can fill in if you have any comments.

1.3 *More information*

The TAC Xenta 400 I/O modules and the other TAC Xenta units are also described in the following documents:

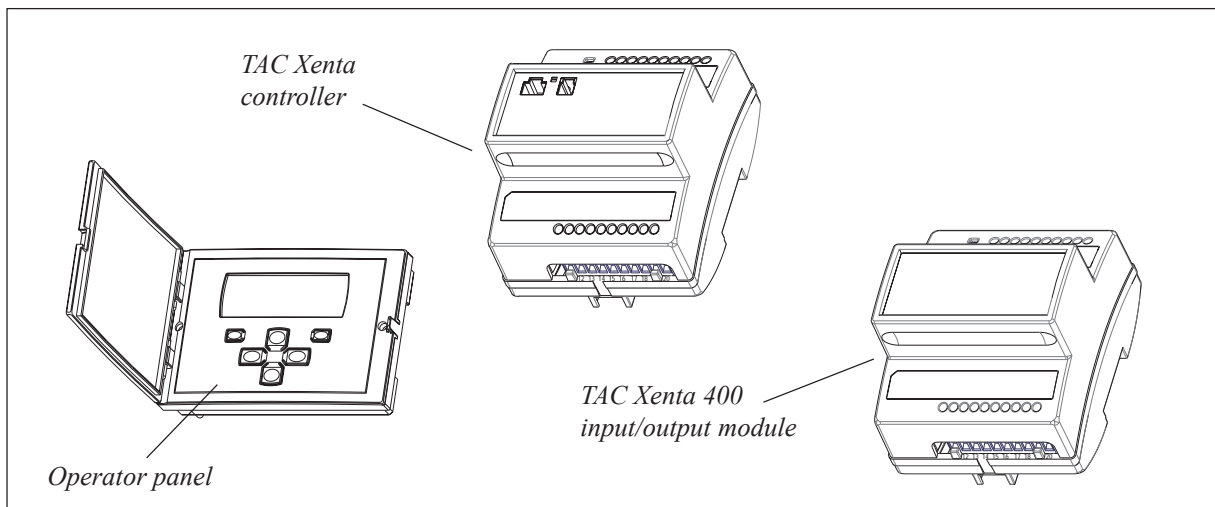
- the “TAC Xenta 300 and 401 Handbook”, part no. 0-004-7768
- the “TAC Xenta OP Handbook”, part no. 0-004-7506
- the “TAC Xenta Network guide”, part no. 0-004-7460
- the “TAC Menta User’s manual”, part no. 0-004-7608
- the “TAC Menta Reference manual”, part no. 0-004-7609
- data sheets for the TAC Xenta 4xx range (C-92-nn)
- the TAC Xenta OP Operator panel data sheet (C-98-05)
- a brief installation instruction, “OFL”, included at delivery

2 I/O modules in the TAC Xenta 400 series

2.1 Hardware units

The TAC Xenta freely-programmable controllers consist of the following units.

- The *TAC Xenta 301/302/401 controller*. The controller is the brain of the system. It contains the database of the inputs and outputs of the plant. It also contains the system and application software for all the functions that are to be performed by the controller and connected peripheral units.
- *I/O expansion modules*, which provide the inputs and outputs of the TAC Xenta controller.
- The *TAC Xenta OP* is an easy-to-use operator panel, with a display. The values are presented in plain language in a menu system. The OP can be connected to any controller in the network.



TAC Xenta units; the Operator panel, the TAC Xenta controller (here: 401) and an I/O expansion module

A number of controllers and I/O modules can form a local network and exchange data.

The TAC Xenta OP operator panel is used to give the user access to certain parameters and make it possible to present alarms without communicating with a central system. The most important functions of the operator panel are status monitoring, adjustment of setpoints and time channels and the display of alarms.

A maximum of two OPs may be connected to each controller.

The I/O modules are used as expansion modules for the TAC Xenta controllers, connected to these via the common TP/FT-10 network.

The modules have different I/O configurations to suit different applications. Some models have indicators for the digital input status and a manual override for the digital or analog outputs. An overview of the available models is shown below.

I/O module TAC	DI	DI status	DO	DO override	UI	TI	AO	AO override
Xenta 411	10	-	-	-	-	-	-	-
Xenta 412	10	10	-	-	-	-	-	-
Xenta 421	4	-	5	-	-	-	-	-
Xenta 422	4	4	5	5	-	-	-	-
Xenta 451	-	-	-	-	4	4	2	-
Xenta 452	-	4 ¹	-	-	4	4	2	2
Xenta 471	-	-	-	-	8 ²	-	-	-
Xenta 491	-	-	-	-	-	-	8	-
Xenta 492	-	-	-	-	-	-	8	8

¹ Status indication only when the corresponding universal inputs (UI) are being used as digital inputs.

² 0/4–20 mA or 0/2–10 V DC

where

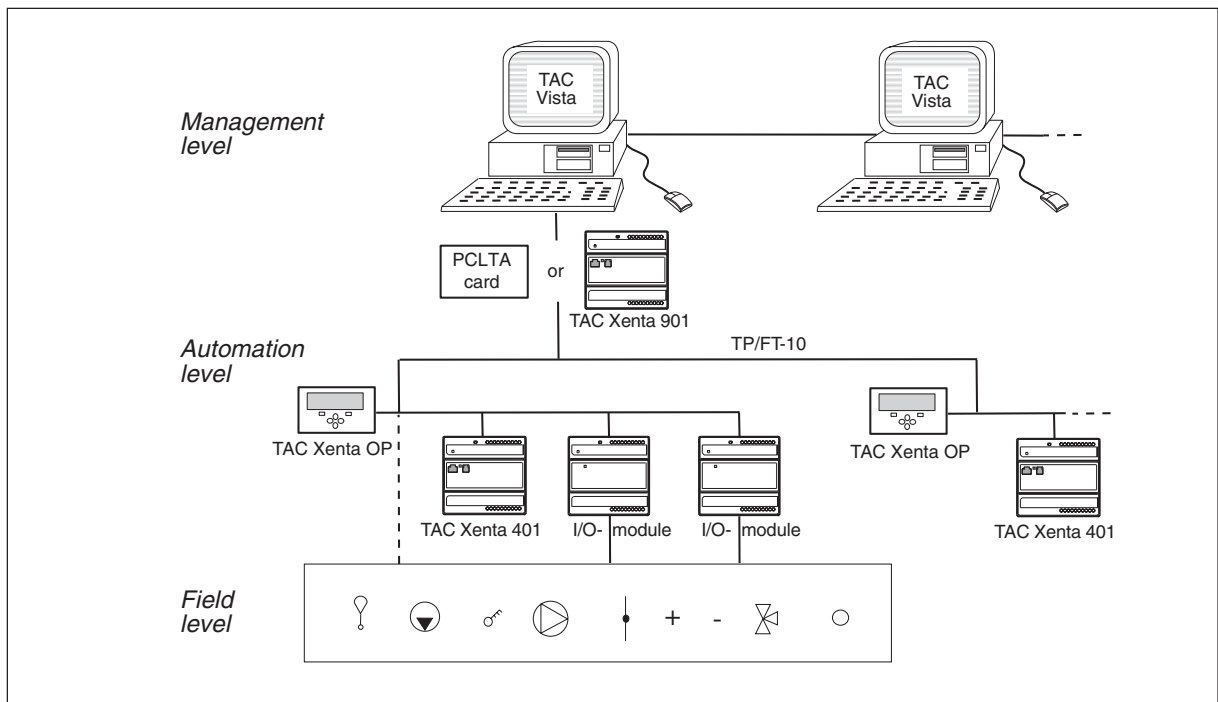
DI: Digital input
 DO: Digital output
 UI: Universal input
 TI: Thermistor input
 AO: Analog output

2.2 Configurations

The I/O modules of the TAC Xenta 400 series can be used in different configurations, for example:

- Together with a stand-alone controller.
- With controllers and OPs in a network.
- Controllers, OPs, I/O modules and other equipment in a full network with suitable adapters, possibly connected to a TAC Vista Central System.

For further information, please consult the “TAC Xenta Network guide”.



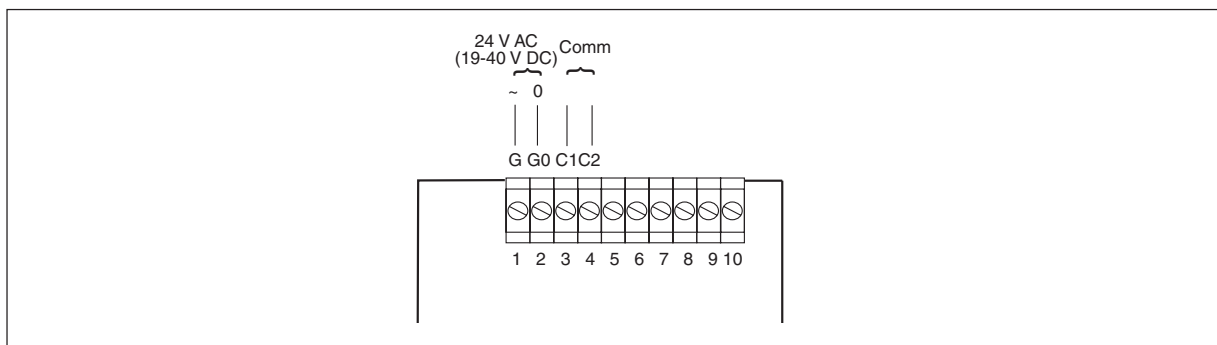
An example of a TAC Xenta network

3 Technical description

3.1 Common features

3.1.1 Terminals

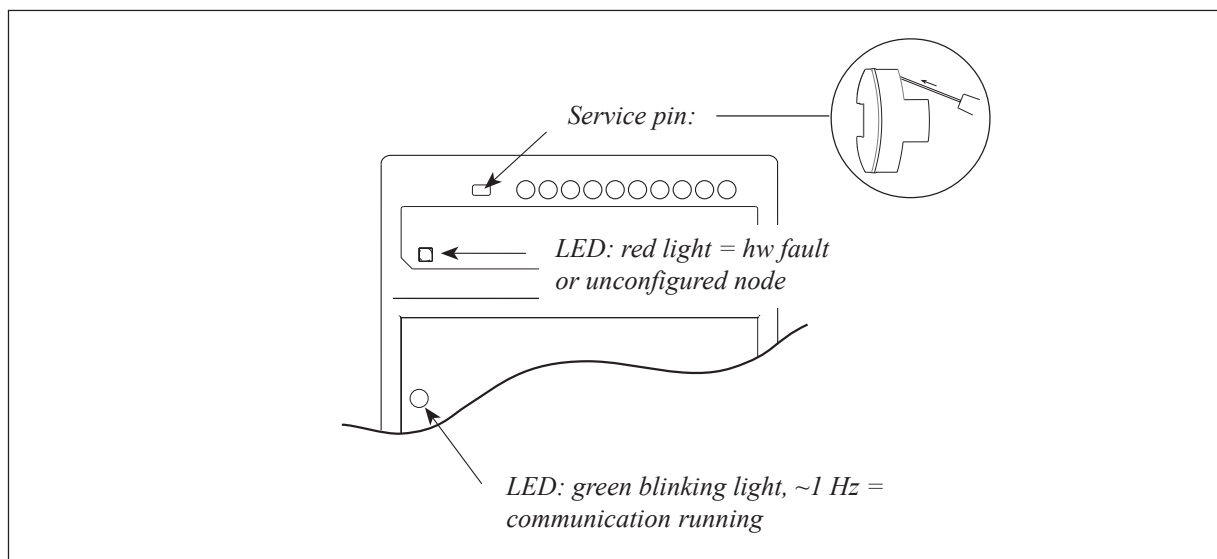
In all the modules, the first four screw terminals are used in the same way, i.e. two for the power supply and two for network communication.



Terminals 1-4 of the TAC Xenta I/O modules

3.1.2 Indicators and Service pin

On the front, there is a small hole through which the Service pin may be activated, as well as two LED indicators, one red and one green.



LEDs and Service pin of the I/O modules

3.1.3 Technical data, common to all

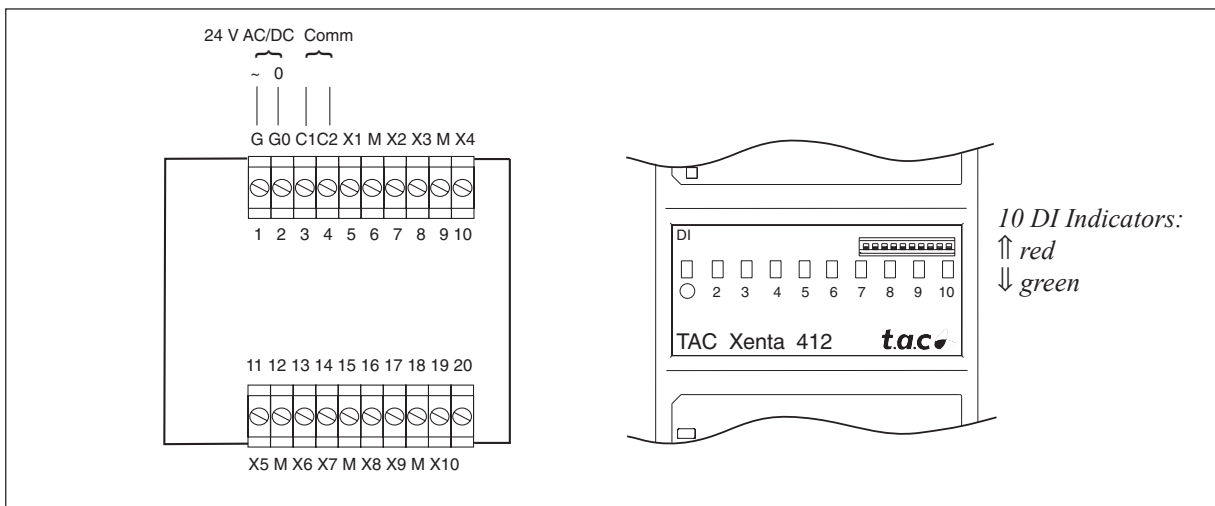
Supply voltage (G, G0)	24 V AC \pm 20%, 50/60 Hz
.....	or 19–40 V DC
Power consumption	max. 2 W
<i>except</i> TAC Xenta 471	max. 10 W
Ambient temperature (<i>except</i> TAC Xenta 421XT and 422XT):	
Storage	–20 °C to +50 °C
Operation	0 °C to +50 °C
Ambient temperature TAC Xenta 421XT and 422XT:	
Storage and Operation	–20 to +70 °C
Humidity	max. 90 % RH non condensing
Mechanical:	
Enclosure	ABS/PC
Enclosure rating	IP 20
Dimensions (mm)	90×110×77
Weight	0.5 kg
Communication (C1–C2; polarity insensitive):	
TAC Xenta Base unit	TP/FT-10, screw terminal
Agency compliances:	
Emission	EN 50081-1
Immunity	EN 50082-1
Safety	EN 61010-1
Part numbers:	
Electronics part TAC Xenta 401	0-073-0101
Terminal part TAC Xenta 400	0-073-0902
Operator terminal TAC Xenta OP	0-073-0907
Connection cable TAC Xenta – RS232	0-073-0903
Electronics part TAC Xenta 411 (10 DI)	0-073-0201
Electronics part TAC Xenta 412 (10 DI)	
(with LED indicators)	0-073-0203
Electronics part TAC Xenta 421 (4 DI, 5 DO)	0-073-0241
Electronics part TAC Xenta 421XT	0-073-0242
Electronics part TAC Xenta 422 (4 DI, 5 DO)	
(with LED indicators and DO override)	0-073-0243
Electronics part TAC Xenta 422XT	0-073-0244
Electronics part TAC Xenta 451 (4 UI, 4 TI, 2 AO)	0-073-0281
Electronics part TAC Xenta 452 (4 UI, 4 TI, 2 AO)	
(with LED indicators and AO override)	0-073-0283
Electronics part TAC Xenta 471 (8 UI, mA/VDC)	0-073-0291
Electronics part TAC Xenta 491 (8 AO)	0-073-0301
Electronics part TAC Xenta 492 (8 AO)	
(with AO override)	0-073-0303

3.2 The TAC Xenta 411/412 Digital Input module

The modules have ten digital inputs and these inputs can also be used as pulse counters.

In addition, the TAC Xenta 412 is equipped with LED status indicators, one for each digital input. The LED colors, red or green, are individually selectable, by setting switches under the front cover.

Terminals (411, 412) and Indicators (412)



TAC Xenta 411/412 terminals and TAC Xenta 412 DI indicators

Type	No.	TAC Menta Block type	Terminal ref.	Indicators (412)
Digital input	10	DI - Digital input <i>or</i>	X1 - X10	red or green
		CNT - Pulse counter	X1 - X10	red or green

Technical data TAC Xenta 411 and 412

Digital inputs (X1–X10):

- Quantity 10
- Voltage across open contact 33 V DC
- Current through closed contact 4 mA
- Pulse input duration (TAC Menta CNT block) min. 20 ms

LED digital input status indicators (TAC Xenta 412 only):

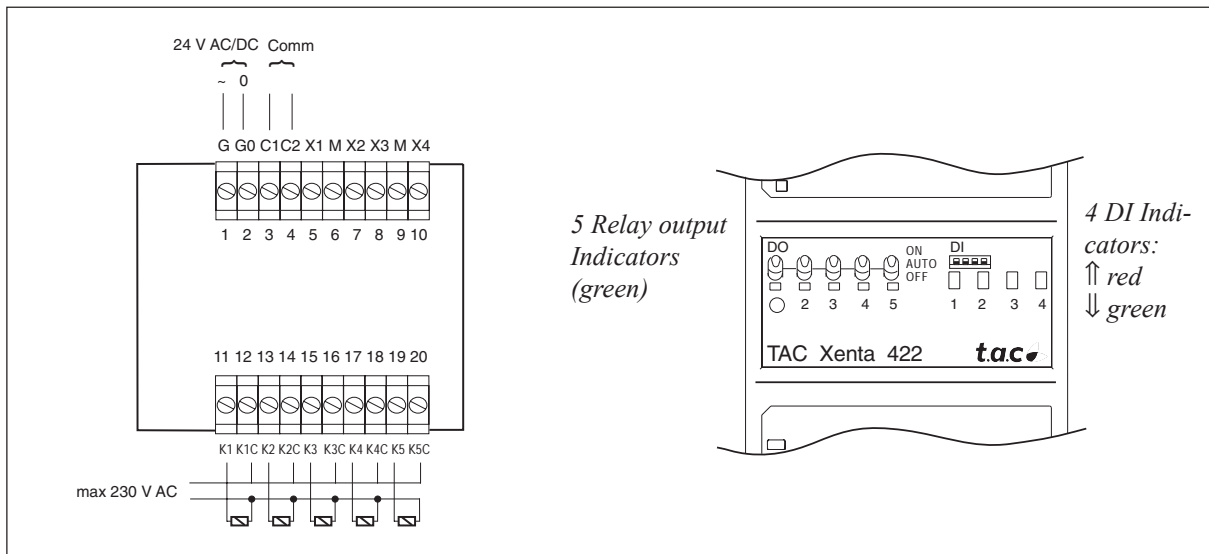
- Quantity 10
- Color red or green, selectable via DIP switch

3.3 The TAC Xenta 421/422 Digital Input and Output module

The modules have four digital inputs and five digital outputs. The inputs can also be used as pulse counters.

In addition, the TAC Xenta 422 is equipped with LED status indicators, one for each digital input and manual override switches for the digital outputs. The LED colors, red or green, are individually selectable, by setting switches under the front cover.

Terminals (421, 422) and Switches/Indicators (422)



TAC Xenta 421/422 terminals and TAC Xenta 422 relay output switches and Indicators

Type	No.	TAC Menta Block type	Terminal ref.	Ind./ Override(422)
Digital inputs	4	DI - Digital input <i>or</i>	X1 - X4	red or green / -
		CNT - Pulse counter	X1 - X4	red or green / -
Relay outputs / Digital outputs	5	DO - Digital output <i>or</i>	K1 -K5	green ¹ / ON-AUTO-OFF
		DOPU - Digital pulse output	K1 -K5	green ¹ / ON-AUTO-OFF

¹ **Note!** The five output indicators always show the AUTO output status, irrespective of the output override switch position (ON-AUTO-OFF).

Technical data TAC Xenta 421 and 422

Digital inputs (X1–X4):

Quantity	4
Voltage across open contact	33 V DC
Current through closed contact	4 mA
Pulse input duration (TAC Menta CNT block)	min. 20 ms

Digital outputs (K1–K5):

Quantity	5
Control voltage, relay outp. protected by a max. 10 A fuse, 230 V AC	
Control current	max 2 A
Pulse length (TAC Menta DOPU block).....	min. 0.5 s

LED digital input status indicators (TAC Xenta 422 only):

Quantity	4
Color	red or green, selectable via DIP switch

Manual override for digital outputs (TAC Xenta 422 only):

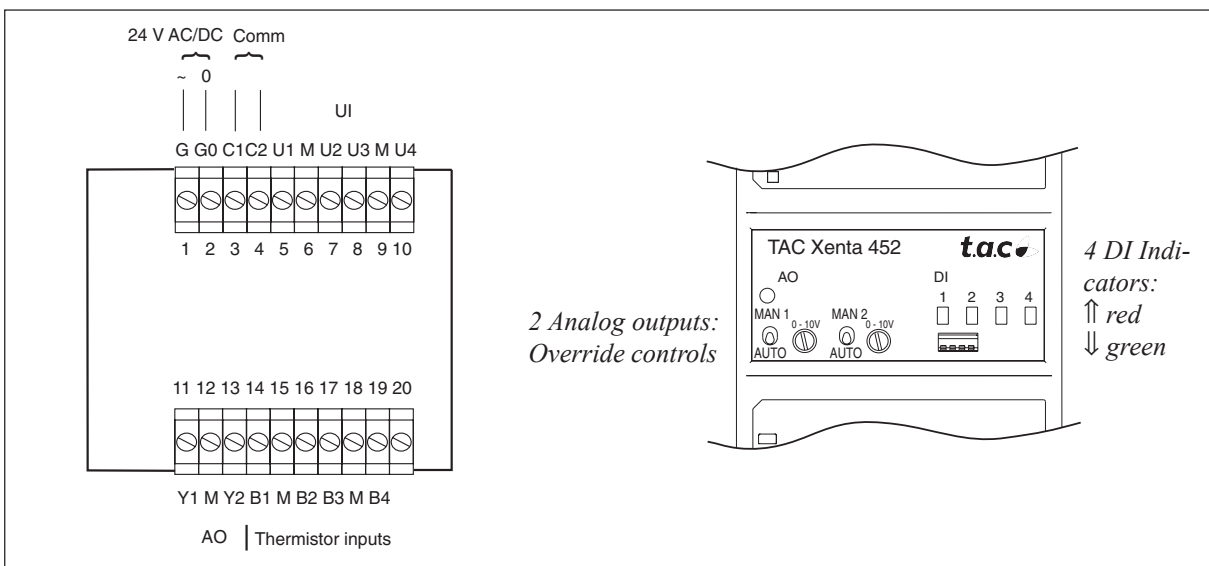
Quantity	5
Switch positions	ON, AUTO, OFF
Indicators for Auto output status	green LEDs

3.4 The TAC Xenta 451/452 Analog Input and Output module

The modules have four universal inputs, four thermistor inputs and two analog outputs. The universal inputs can also be used as digital inputs or pulse counters.

In addition, the TAC Xenta 452 is equipped with LED status indicators, one for each universal input, when used as a digital input, and manual override controls for the analog output values. The LED input status colors, red or green, are individually selectable, by setting switches under the front cover.

Terminals (451, 452) and Controls/Indicators (452)



TAC Xenta 451/452 terminals and TAC Xenta 452 Analog output override controls and Indicators

Type	No.	TAC Menta Block type	Terminal ref.	Ind./ Override (452)
Thermistor inputs	4	AI - Analog input	B1 - B4	–
Universal inputs	4	AI - Analog input <i>or</i>	U1 - U4	–
		DI - Digital input <i>or</i>	U1 - U4	red or green / –
		CNT - Pulse counter	U1 - U4	–
Analog outputs	2	AO - Analog output	Y1 - Y2	– / Man-Auto

Technical data TAC Xenta 451 and 452

Universal inputs (U1–U4):

Quantity	4
A/D-resolution	12 bits
–as Digital Inputs;	
Voltage across open contact	max. 28 V DC
Current through closed contact	4 mA
Pulse input duration (TAC Menta CNT block)	min. 80 ms
–as Thermistor Inputs;	
Supply voltage	0.6 V DC
TAC thermistor sensor	1800 ohms at 25 °C
–as Voltage Inputs;	
Input signal	0–10 V DC
Input resistance	100 kohms
accuracy	1% of full scale

Thermistor inputs (B1–B4):

Quantity	4
A/D-resolution	12 bits
TAC thermistor sensor	1800 ohms at 25 °C
Measuring range	–50 °C to +150 °C
Accuracy:	
–50 °C to –30 °C	±4 °C
–30 °C to –10 °C	±2 °C
–10 °C to +10 °C	±1 °C
+10 °C to +30 °C	±0,5 °C
+30 °C to +60 °C	±1 °C
+60 °C to +120 °C	±2 °C
+120 °C to +150 °C	±4 °C

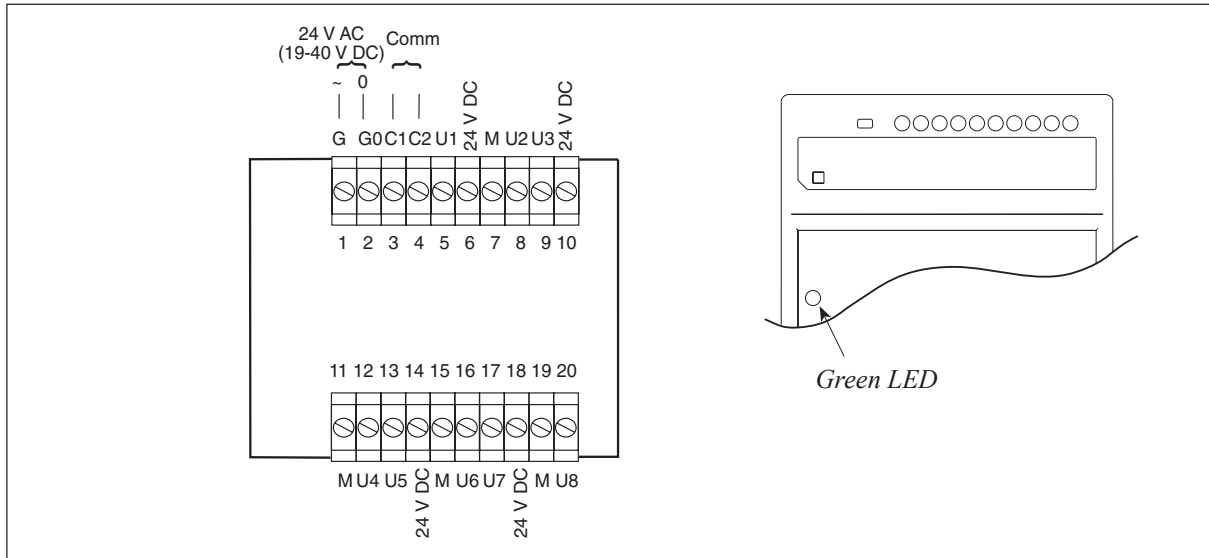
Analog outputs (Y1–Y2):

Quantity	2
D/A-resolution	12 bits
Control voltage	0–10 V DC
Control current, short-circuit proof	max. 2 mA
Deviation	max ±1%

3.5 The TAC Xenta 471 Analog Input module

The module has eight universal analog inputs (U). The analog inputs can independently be used for current input or as voltage inputs. The current inputs use either the *internal* power (24V DC) or the *external* power (M).

Terminals on 471



The TAC Xenta 471 terminals

Type	No.	TAC Menta Block type	Terminal ref.	Override
Universal inputs	8	AI - Analog inputs	U1 - U8	(N.A.)

Restore to default values

If you press the Service Pin for seven seconds during the first minute following a restart, the parameters of the module will be restored to the factory default values. A restart occurs following power on.

The green LED on the front will light continuously during activation (about 7 seconds) and when the restore has finished, it will flash rapidly (off-line indication).

The parameters of the I/O module will now be restored:

- Domain table index 0: ID len = 1, ID = 11_{hex}, Subnet = 1, Node = 1 and Clone Domain = 0.
- Domain table index 1: Unused.
- Address table index 0: Domain = 0, Node = 0, Rpt Tmr = 16, Retries = 0, Rcv Tmr = 128, Tx Tmr = 16, Subnet = 0.
- Address table index 1: Unused.
- Non_Group_Receive_Timer = 768 ms.
- Node Mode: Unconfig.

- Network Management Authentication = Off
- Pre-emption Timeout = Forever
- The inputs will be configured as voltage inputs.

Technical data TAC Xenta 471

Universal inputs (U1–U8):

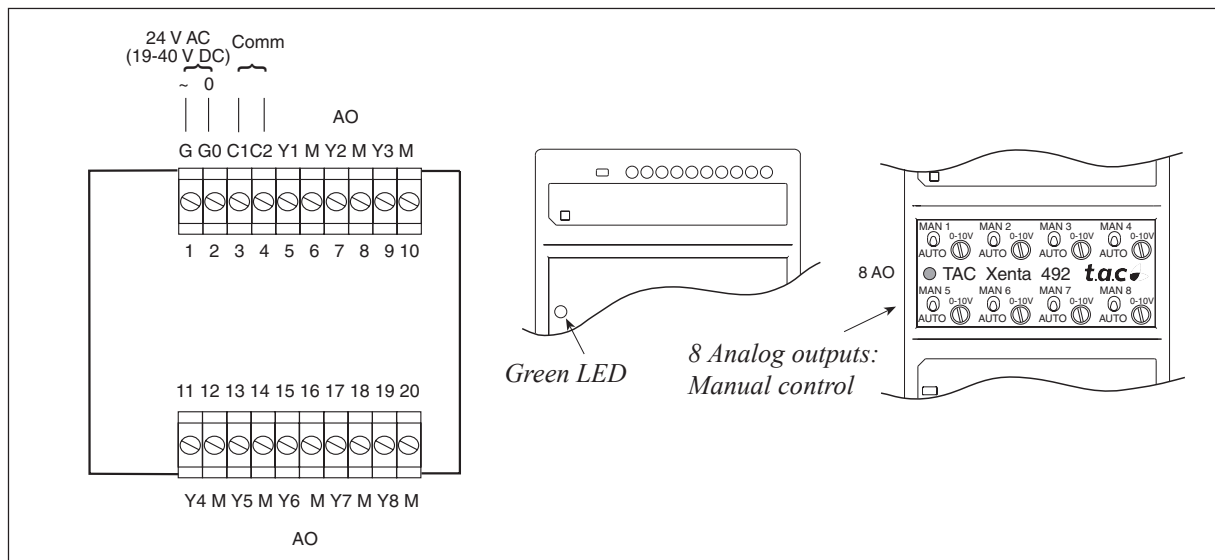
- Quantity 8
- A/D-resolution 12 bits
- as current input with an *external* power supply;
 - Input signal (terminals U–M) 0/4–20 mA
 - Input resistance 20 ohms
 - accuracy within 0.02 mA
- as current input with an *internal* power supply;
 - Input signal (terminals 24 V DC–U) 4–20 mA
 - Input resistance 20 ohms
 - accuracy within 0.02 mA
 - Voltage 24 V DC ±2 V
 - Current limit, total value 200 ±20 mA
- as Voltage input;
 - Input signal (terminals U–M) 0–1, 0/2–10 V DC
 - Input resistance 100 kohms
 - accuracy within 0.01 V

3.6 The TAC Xenta 491/492 Analog Output module

The modules have eight analog outputs.

Additionally, the TAC Xenta 492 has switches for manually controlling the analog outputs.

Terminals (491, 492) and switches (492)



TAC Xenta 491/492 terminals and manual control of the TAC Xenta 492

Type	No.	TAC Menta Block type	Terminal ref.	Override (492)
Analog outputs	8	AO - Analog outputs	Y1 -Y8	- / Man-Auto

Restoring to the default values

If you press the Service Pin for seven seconds during the first minute following a restart, the parameters of the module will be restored to the factory default values. A restart occurs following power on.

The green LED on the front will light continuously during activation (about 7 seconds) and when the restore has finished, it will flash rapidly (off-line indication).

The parameters of the I/O module will now be restored:

- Domain table index 0: ID len = 1, ID = 11_{hex}, Subnet = 1, Node = 1 and Clone Domain = 0.
- Domain table index 1: Unused.
- Address table index 0: Domain = 0, Node = 0, Rpt Tmr = 16, Retries = 0, Rcv Tmr = 128, Tx Tmr = 16, Subnet = 0.
- Address table index 1: Unused.
- Non_Group_Receive_Timer = 768 ms.
- Node Mode: Unconfig.
- Network Management Authentication = Off
- Pre-emption Timeout = Forever
- The start values of the analog outputs will be reset.

Technical data TAC Xenta 491 and 492

Analog outputs (Y1–Y8):

Quantity	8
D/A-resolution	12 bits
Control voltage	0–10 V DC
Control current, short-circuit proof	max. 2 mA
Deviation	max ±1%

Manual control of the analog outputs (TAC Xenta 492 only):

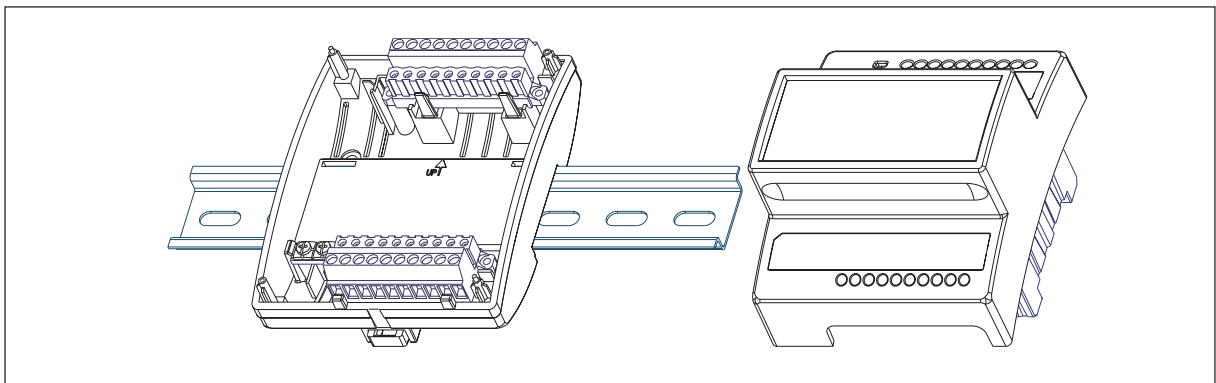
Quantity	8
Switch positions	MAN, AUTO
Control interval	0–10 V

4 Installation

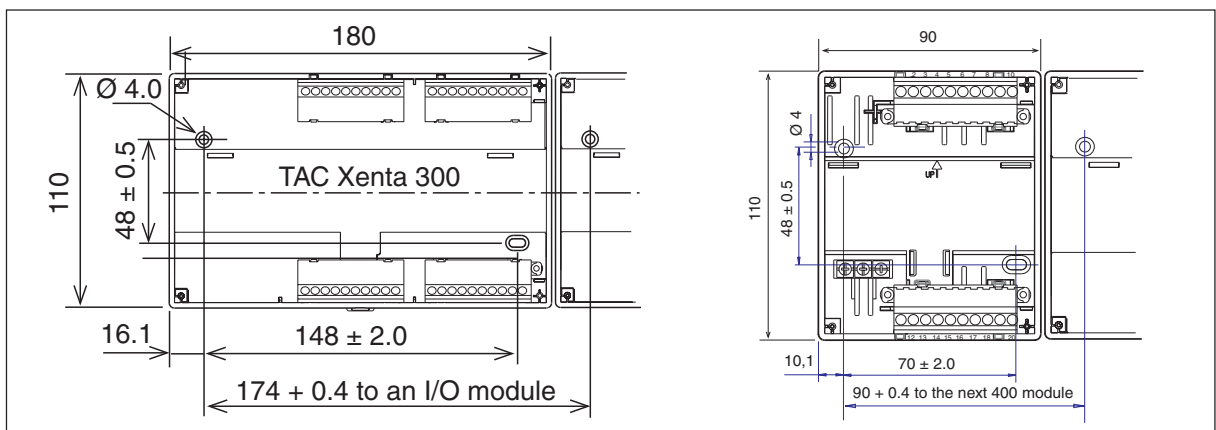
4.1 Mounting

The TAC Xenta controllers and I/O modules are designed for mounting on a DIN rail inside a cabinet. They can also be mounted directly on a wall. In such cases, a wide range of standard enclosures are available which meet DIN 43 880, with different enclosure ratings.

The enclosure mainly consists of a terminal part containing screw terminals, as well as an electronics part, where the printed circuit boards are situated. The enclosure is designed so that electrical installation can be carried out using the screw terminals of the terminal part, when mounted on a DIN rail or wall.



The terminal part and the electronics part of the TAC Xenta I/O module



Mounting distances for TAC Xenta controllers and one or more I/O modules

4.2 Electrical installation

4.2.1 General considerations

Installation is normally treated as category CAT III (IEC 664), which in principle means permanent connection to a 230 V AC mains supply. For the Xenta 400, this is only applicable to the relay outputs of the I/O modules.

All equipment connected to the TAC Xenta units must comply with the following standards:

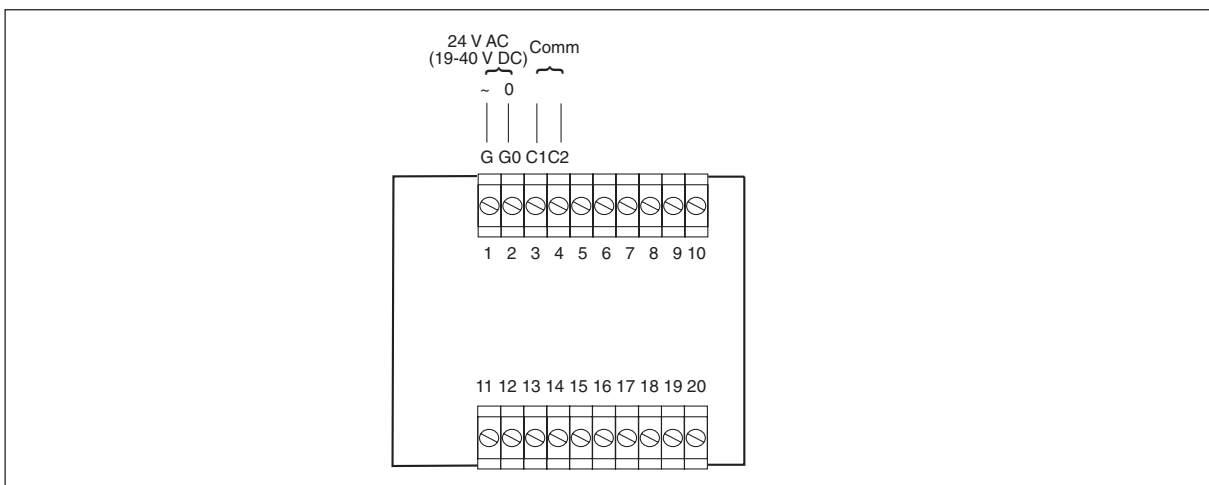
- **EN 60 742** (or other relevant safety standard; for example ETL listing UL 3111-1, first version and CAN/CSA C22.2 No. 1010.1-92) for the device(s) that provide an ELV-type power supply (normally 24 V AC) to the controller and other connected equipment.
- **EN 61 010** or **IEC 950** (or other relevant safety standard) for computers, modems and other equipment powered by a 230 V mains supply.

If equipment using a 230 V mains supply is connected to a relay output terminal of the I/O modules, low-voltage equipment connected to the other relay terminals of the controller must provide at least basic insulation to all touchable parts.

We strongly recommend that switches are installed to make it possible to separate external equipment when the relay output terminals control equipment using a 230 V mains supply.

4.2.2 Terminals and units

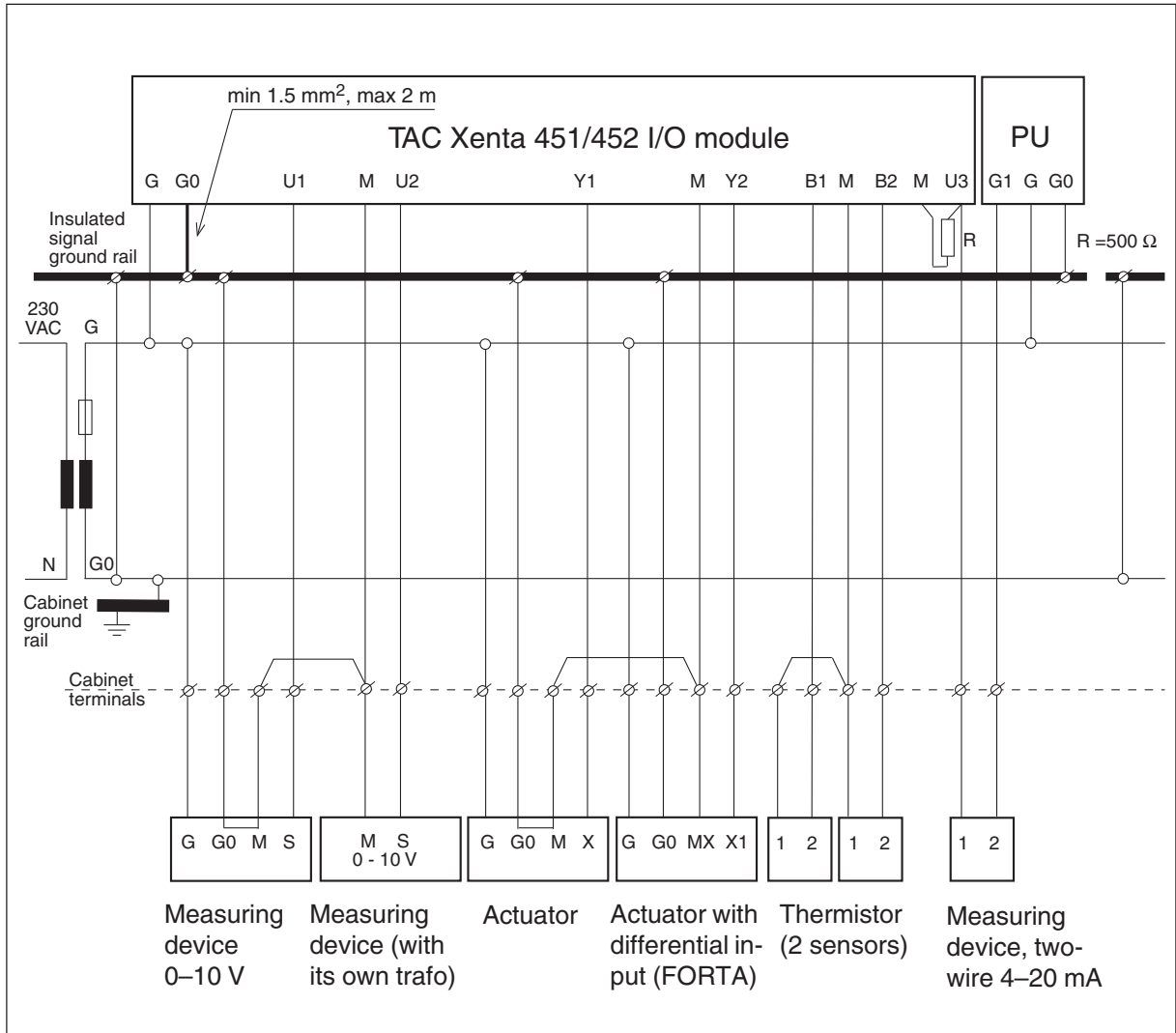
- Mount the terminal part on a DIN rail.
- Connect the cables to the correct terminals, see the figure below.
- Put the electronics part of the module on the terminal part.



The terminal blocks of a TAC Xenta 400

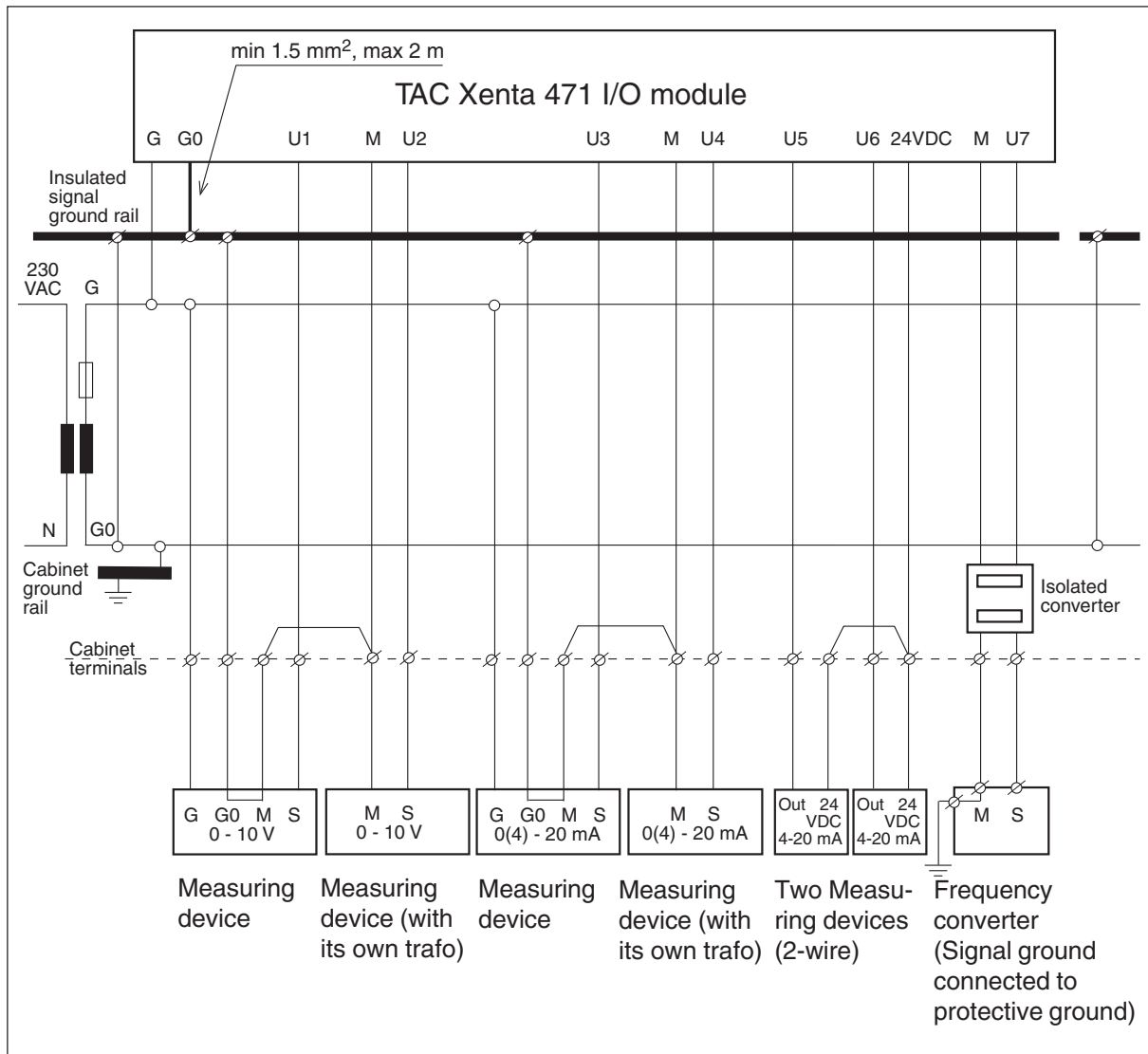
Connections

When cabinet mounting is used, jumpers may be used between M (measurement neutral) terminal pairs, as shown in the figure below and on the next page. All G0 points must be connected to protective ground.



Basic circuit diagram for cabinet connections of TAC Xenta 451/452 I/O modules

A corresponding diagram for the TAC Xenta 471 is shown on the next page.

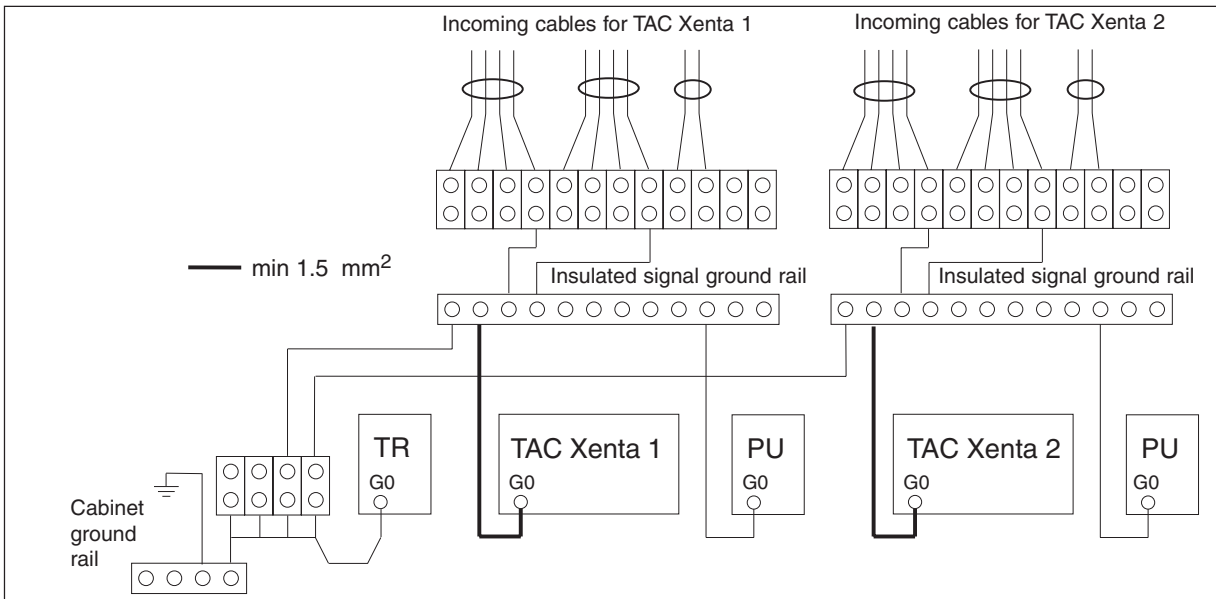


Basic circuit diagram for cabinet connections of TAC Xenta 471 I/O module

When connecting G0 to ground, each TAC Xenta unit must have its own connection to the ground rail, i.e. jumpers cannot be used for the G0 terminals. Please refer to the figure on the next page.

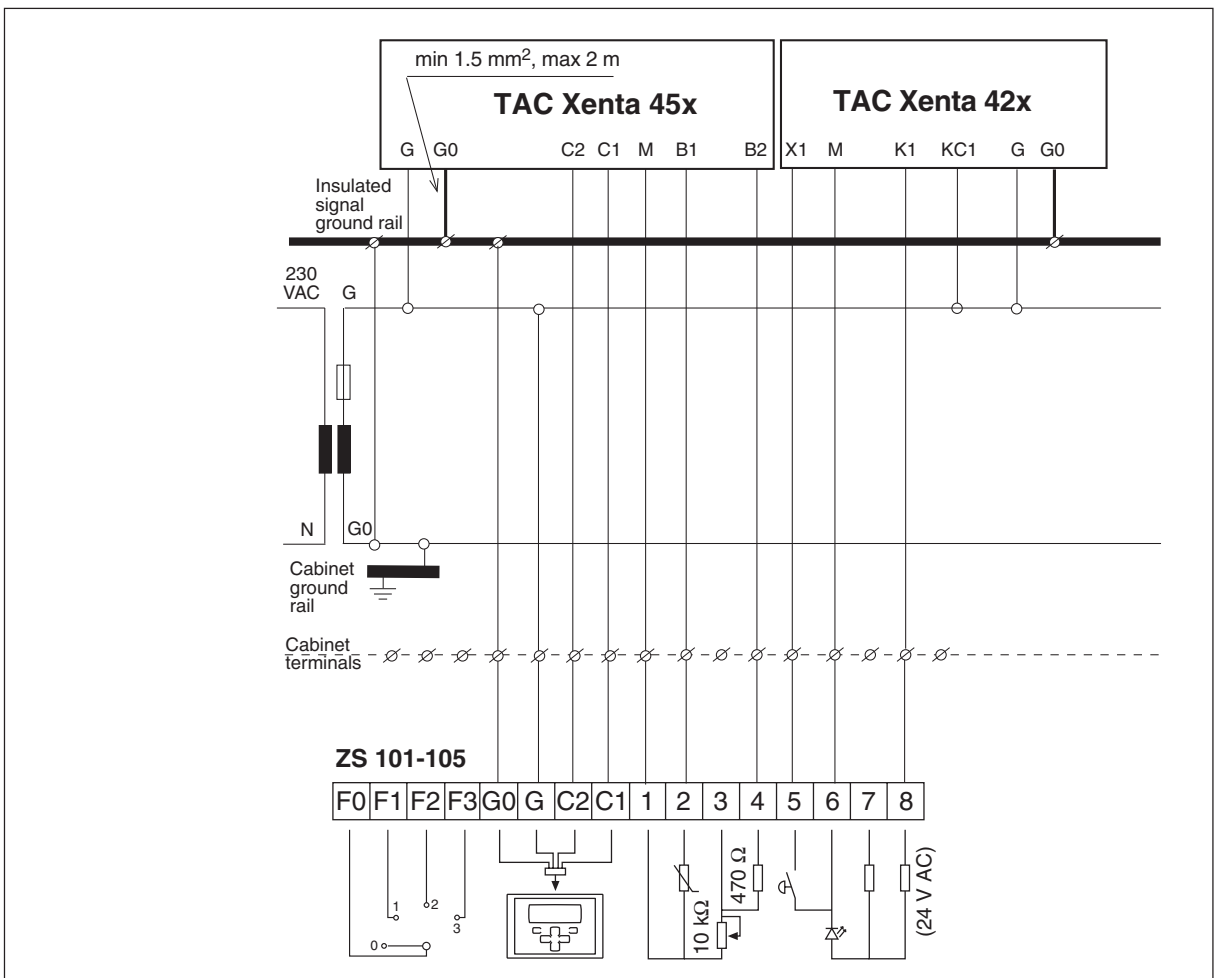
Several units may share the same ground rail, but every unit with measuring inputs and/or analog outputs must have all its ground connections with the same ground rail.

In other words, a discontinuation in the ground rail must not split a controller or separate it from the connected units.



Connections between insulated signal ground rails and the cabinet ground rail

When a Wall Module (ZS101–105) is connected to TAC Xenta 400 I/O modules, the following terminals can be used (term. B2: v 3.0 or later).



Basic circuit diagram for connecting Wall Module ZS 101–105 to TAC Xenta 400 I/O modules

4.2.3 Cables

Power and Communication

G and G0 (Power supply):

G, min. cross-sectional area 0.75 mm²

G0 to TAC Xenta, min. cross-sectional area 1.5 mm²

C1 and C2 (Network):

The TP/FT-10 system allows the user to wire the control devices with virtually no topology restrictions.

Min. cross-sectional area 0.65 mm² (22 AWG)

The max. wire length in one segment depends on the type of wire and the topology, see the table below.

The wires are not polarity sensitive, but must be a twisted-pair.

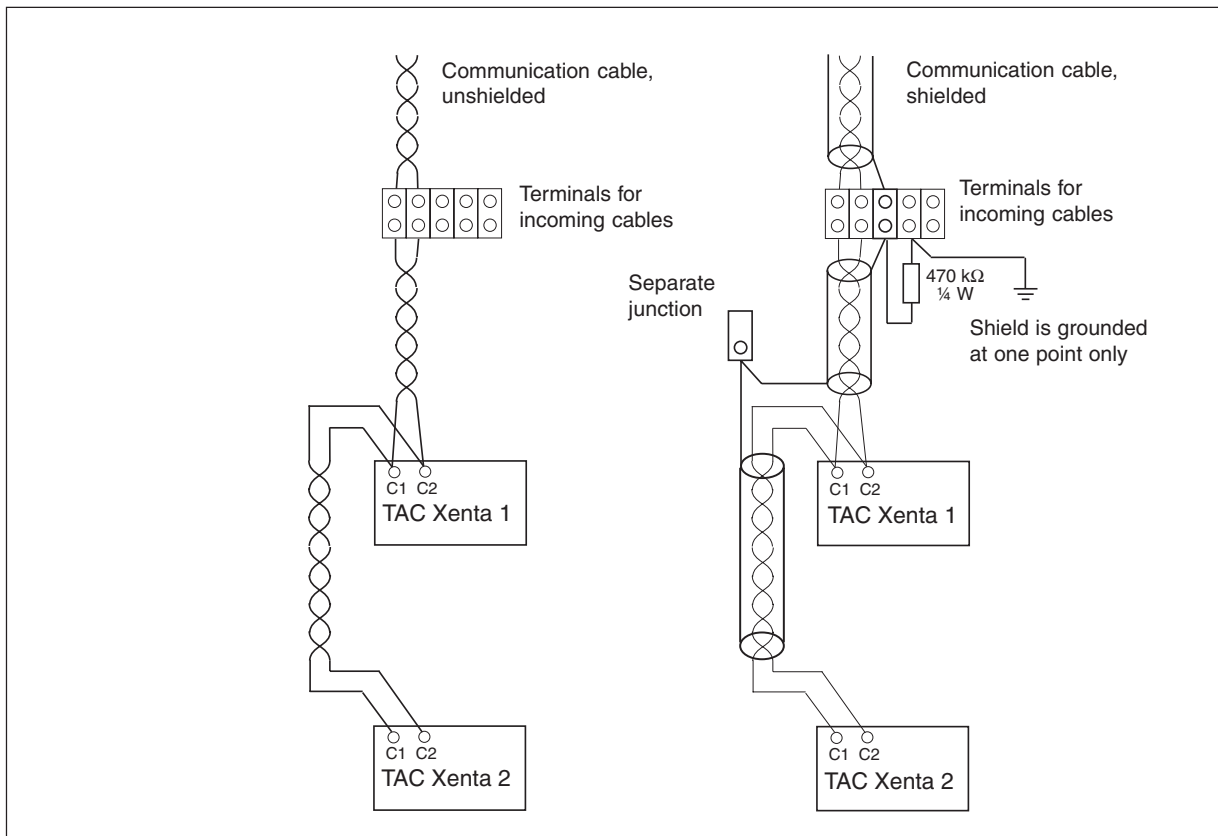
For more details, please refer to the "TAC Xenta Network guide".

One of the following cable types must be used:

Cable	Max. bus length, doubly terminated bus topology (m)	Max. node-to-node distance, single terminated free topology	Max. total wire length single terminated free topology
Belden 85102, single twisted pair	2700	500	500
Belden 8471, single twisted pair	2700	400	500
UL Level IV 22AWG, twisted pair	1400	400	500
Connect-Air 22AWG, 1 or 2 pairs	1400	400	500
Siemens J-Y(st)Y 2x2x0.8 4-wire helical twist, solid, shielded	900	320	500
TIA568A Cat. 5 24AWG, twisted p.	900	250	450

If a shielded communication cable is used, the shield must be grounded at one point only.

Redundant wires (second pair of Siemens J-Y(st)Y) are cut at the end of the shield.



Connecting the communication cable

TAC Xenta 400 I/O modules

Terminals type X:

Min. cross-sectional area	0.25 mm ²
Max. cable length	200 m

Terminals type U, connected as

a) digital inputs,	
b) measurement devices using voltage signals that are <i>not</i> powered via the same transformer as the I/O module or	
c) measurement devices using current signal	
Min. cross-sectional area	0.25 mm ²
Max. cable length	200 m

Terminals type U, connecting measurement devices, using voltage signals that are powered via the *same* transformer as the I/O module:

Min. cross-sectional area	0.75 mm ²
Max. cable length	20 m

Terminals type B or U, as thermistor inputs:

Min. cross-sectional area	0.75 mm ²
Max. cable length,	
up to 75 °C, cross-sectional area 0.75 mm ²	75 m
up to 75 °C, cross-sectional area 1.5 mm ²	150 m
up to 150 °C, cross-sectional area 1.5 mm ²	75 m

Terminals type K (relay outputs):

Cross-sectional area	0.75 – 1.5 mm ²
Max. cable length	200 m

Terminals type Y (for actuators powered via the *same* transformer as the I/O module):

Min. cross-sectional area	0.75 mm ²
Max. cable length ¹	20 m

Terminals type Y (for actuators power supplied via their *own* transformer, external or internal; or when the outputs have isolated converters):

Min. cross-sectional area	0.25 mm ²
Max. cable length	200 m

¹ Some actuators allow greater cable lengths, for example:

EM52	0.5 mm ²	80m	three wires	
EM15LBB	0.75 mm ²	80m	three wires	
EM42	0.75 mm ²	80m	four wires	
TACForta	0.75 mm ²	80m	four wires	
TACForta	1.5 mm ²	100m	three wires	(partnos.xxxx-010)

4.3 Commissioning

Commissioning of the I/O modules is always carried out together with the base units (TAC Xenta controllers) that they belong to.

The procedure is therefore described in the TAC Xenta 300 and 401 manuals.

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You can help to make this manual even better!

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Reply form _____

I have found the following errors and/or unclear descriptions in the “TAC Xenta 400 I/O modules” (part number 0-004-7771-1 (GB)):

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