The essential guide AS-Interface

Cabling system

2013









AS-Interface cabling system

AS-Interface safety at work

> Maximum performance and safety integrity level for the solution (PL e according to EN ISO 13849-1 and SIL 3 according to EN IEC 62061)



(Actuator Sensor Interface)

Simplicity

A quick and expandable cabling system:

- > Only 1 cable for connecting all the components of an automation system
- > Management of communications integrated in the products

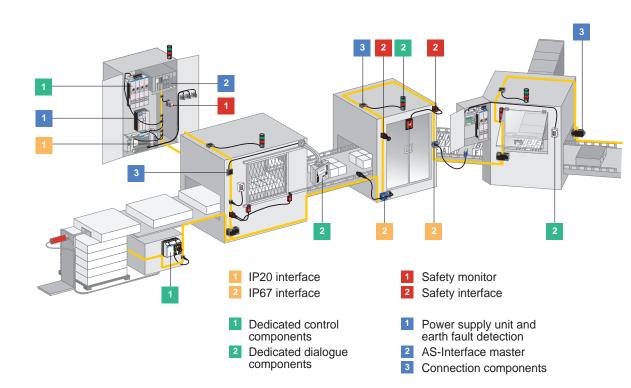
Maximum security

AS-Interface significantly improves the reliability, availability and safety of your machine:

- > Cabling errors are eliminated
- > Risk of electrical connection failure greatly reduced
- > High immunity to electromagnetic interference (EMC)
- > The machine's safety function is fully integrated with AS-Interface Safety at Work.

Up to 40% savings in costs

- > Savings in time for design, installation, setting-up and commissioning
- Savings in space required in enclosures due to smaller products and elimination of intermediate boxes
- > Control cabling eliminated and reduction in cable ducting



Contents



AS-Interface cabling system

Modicon interfaces for generic products	2 to 3
IP20 interfaces	
IP67 interfaces	
Dedicated components	4 to 5
For control	
For dialogue	
1 of dialoguo	
Installation system	6 to 8
Master modules, power supply units	
Cables, repeaters	
Accessories	
Tools	9
Adjustment and addressing terminals	
Adjustitions and addressing terrillials	

Modicon interfaces for generic products IP20 for mounting in enclosure











			13.54	-	-
Modular interface, width 25 mm	Analogue		Digital		
V2.1 with standard addressing					
Number of inputs	2 (010V)	2 (0/420mA)	4	4	4 isolated
Number of outputs	-	-	4 relay, 2A	4 solid state, 0.5A	4 solid state, 0.5A
Type of addressing	Standard				
Supply by AS-Interface	Inputs and sensor s	upply (200 mA max.)			-
Supply by 24 VDC external source (black AUX cable)	-	-	-	Outputs	(2)
AS-Interface profile	S.7.3.F.D	S.7.3.F.D	S.7.0.F.E	S.7.0.F.E	S.7.0.F.E
Maximum consumption from AS-Interface (excluding sensor supply)	60 mA	60 mA	110 mA	50 mA	20 mA
Dimensions (WxDxH)	25x77x87 mm	25x77x87 mm	25x77x87 mm	25x77x87 mm	25x77x87 mm
References	ASI20MA2VU	ASI20MA2VI	ASI20MT4I4OR	ASI20MT4I4OS	ASI20MT4I4OSA
Accessory (1) for connection to flat cables	TCSATN01N2	TCSATN01N2	TCSATN01N2	TCSATV01N2	TCSATV01N2

⁽¹⁾ Or direct screw terminal connection (without accessory).











			4100		
Modular interface, width 25 mm	Digital				
V2.1 with Extended (A/B) addressing					
Number of inputs	4	2	4	4	4 isolated
Number of outputs	-	1 triac, 2A	3 relay, 2A	3 solid state, 0.5A	3 solid state, 0.5A
Type of addressing	Extended (A/B)				
Supply by AS-Interface	Inputs and sensor s	upply (200 mA max.) ((3)		-
Supply by 24 VDC external source (black AUX cable)	-	-	_	Outputs	(2)
AS-Interface profile	S.0.A.7.0	S.3.A.7.0	S.7.A.7.0	S.7.A.7.0	S.7.A.7.0
Maximum consumption from AS-Interface (excluding sensor supply)	50 mA	40 mA	90 mA	50 mA	20 mA
Dimensions (WxDxH)	25x77x87 mm	25x77x87 mm	25x77x87 mm	25x77x87 mm	25x77x87 mm
References	ASI20MT4IE	ASI20MT2I1OTE	ASI20MT4I3ORE	ASI20MT4I3OSE	ASI20MT4I3OSAE
Accessory (1) for connection to flat cables	TCSATN01N2	TCSATN01N2	TCSATN01N2	TCSATV01N2	TCSATV01N2

⁽¹⁾ Or direct screw terminal connection (without accessory).

⁽²⁾ Inputs, outputs and sensor supply (200 mA max.).

⁽²⁾ Inputs, outputs and sensor supply (200 mA max.).

⁽³⁾ Except ASI20MT4I3ORE (170 mA max.).

IP67 for mounting on machine









			- Control	1		A.			-
Interface			Digital						
V2.1 with extend	ed (A/B) addre	essing							
Number of inputs			4	2	_	4	4	4	8
Input cabling			Standard (1 x	M12)			"Y" (2 x M12)		"Y" (4 x M12)
Number of outputs			-	2 solid-state, 2A	3 solid-state, 2A	3 solid-state, 2A	_	3 solid-state, 2A	_
Type of addressing			Extended (A/E	3)					
Supply by AS-Interface Inputs and sensor supply (200 mA max. except ASI67FFP22•: 100 mA)			2•: 100 mA)						
Supply by 24 VDC ex	ternal source (blac	ck AUX cable)	-	Outputs	_	Outputs	_	Outputs	_
AS-Interface profile			S.0.A.7.0	S.B.A.7.0	S.8.A.7.0	S.7.A.7.0	S.0.A.7.2	S.7.A.7.E	S.0.A.7.2 (2x)
Maximum consumption	on from AS-Interfac	ce (excluding sensor supply)	45 mA	32 mA	18 mA	48 mA	45 mA	48 mA	90 mA
Dimensions (WxDxH)			45X42X80mm	45X42X80mm	45X42X80mm	60x30,5X151mm	45X42X80mm	60x30,5X151mm	60x30,5X151mm
Connection	IDC	Interface	ASI67FFP40E	ASI67FFP22E	ASI67FFP03E	ASI67FFP43E	ASI67FFP40EY	ASI67FFP43EY	ASI67FFP80EY
		Standard connection base	ASI67FFB01 (1)	ASI67FFB01 (1)	ASI67FFB01 (1)	ASI67FFB03	ASI67FFB01 (1)	ASI67FFB03	ASI67FFB03
	M12 connector	Interface + Connection base	ASI67FMP40E	ASI67FMP22E	ASI67FMP03E	ASI67FMP43E	ASI67FMP40EY	ASI67FMP43EY	-

(1) A connection base with fixing centres that are compatible with the ASIB4VM12 connection base is available. Reference ASI67FFB02.











Interface			Digital					
V2.1 with standa	rd addressing							
Number of inputs	Number of inputs			2	_	4	4	8
Input cabling			Standard (1 x M	Standard (1 x M12) "Y" (2 x M12) "Y" (4 x M12)				
Number of outputs			-	2 solid-state, 2A	4 solid-state, 2A	4 solid-state, 2A	4 solid-state, 2A	_
Type of addressing			Standard					
Supply by AS-Interfac	ce		Inputs and sensor supply (200 mA max. except ASI67FFP22*: 100 mA)					
Supply by 24 VDC ex	ternal source (blac	ck AUX cable)	-	Outputs	Outputs	Outputs	Outputs	_
AS-Interface profile			S.0.0.F.E	S.3.0.F.E	S.8.0.F.E	S.7.0.F.E	S.7.1.F.E	S.0.1.F.F (2x)
Maximum consumption	on from AS-Interfac	ce (excluding sensor supply)	45 mA	32 mA	19 mA	49 mA	49 mA	90 mA
Dimensions (WxDxH))		45X42X80mm	45X42X80mm	45X42X80mm	60x30,5X151mm	60x30,5X151mm	60x30,5X151mm
Connection	IDC	Interface	ASI67FFP40D	ASI67FFP22D	ASI67FFP04D	ASI67FFP44D	ASI67FFP44DY	ASI67FFP80DY
		Standard connection base	ASI67FFB01 (1)	ASI67FFB01 (1)	ASI67FFB01 (1)	ASI67FFB03	ASI67FFB03	ASI67FFB03
	M12 connector	Interface + Connection base	ASI67FMP40D	ASI67FMP22D	ASI67FMP04D	ASI67FMP44D	ASI67FMP44DY	_

(1) A connection base with fixing centres that are compatible with the ASIB4VM12 connection base is available. Reference ASI67FFB02.





Interface		Digital					
V2.1 (V1 compatible) wit	h standard addressing						
Number of inputs		4	2	_	4		
Input cabling		Standard (1 x M12 input)					
Number of outputs		-	2 solid-state, 2A	4 solid-state, 2A	4 solid-state, 2A		
Type of addressing		Standard	Standard				
Supply by AS-Interface		Inputs and sensor supply (200 mA max. except ASI67FFP22°: 100 mA)					
Supply by 24 VDC external sou	rce (black AUX cable)	-	Outputs	Outputs	Outputs		
AS-Interface profile		S.0.0.F.F	S.3.0.F.F	S.8.0.F.F	S.7.0.F.F		
Maximum consumption from AS	G-Interface (excluding sensor supply)	45 mA	32 mA	19 mA	49 mA		
Dimensions (WxDxH)		45x42x80 mm	45x42x80 mm	45x42x80 mm	60x30.5x151 mm		
Connection IDC	Interface	ASI67FFP40A	ASI67FFP22A	ASI67FFP04A	ASI67FFP44A		
	Standard connection base	ASI67FFB01	ASI67FFB01	ASI67FFB01	ASI67FFB03		

AS-Interface — Dedicated components For control





Starter in insulated enclo	osure (1)	Control by			
V1		Black rotary knob (blue bkgrnd.) Pushbuttons			
Type of addressing		Standard			
Supply by AS-Interface		Inputs, sensor supply (2)			
Supply by 24 VDC external sour	ce (black AUX cable)	(2)			
AS-Interface profile		S.7.F.F. (LF3) / S.7.A.7.0. (LF4)			
Maximum consumption from AS-	-Interface	20 mA			
Dimensions (WxDxH)		175x175x195 mm			
References (3)	Non reversing	LF3P••D	LF3M●●D		
(see table below)	Reversing	LF4P••D	LF4M••D		

Connection to AS-Interface and external supply (AUX) by accessory for flat cable: TCSATN011F1 (AS-Interface and AUX cables) or TCSATV011F1 (AS-Interface cable).

- (1) For an LF3 or LF4 starter in a metal enclosure, add the letter M after the 3rd digit in the references listed above (example: LF3P02D becomes LF3MP02D).
- (2) Contactors supplied by AS-Interface or external source, configurable directly on terminal block.
- (3) To complete the reference, replace ●● by the numbers indicated in the table below. (Example: LF3P●●D becomes LF3P00D).

kW	Α	••	kW	Α	••
_	without MCB	00	0.75	1.62.5	07
0.06	0.160.25	02	1.1 / 1.5	2.54	08
0.09	0.250.40	03	2.2	46.3	10
0.12 / 0.18	0.400.63	04	3/4	610	14
0.25	0.631	05	5.5	914	16
0.37/ 0.55	11.6	06			

kW= Motor power ratings in category AC-3, 400/415V, in kilowatts.

A= Adjustable range of circuit-breaker thermal trips, in amperes.



TeSys U	
Standard	Extended (A/B)
-	-
Coil	Coil
S.7.D.F.0	7.A.7.E
30 mA	30 mA
depending on LU model	depending on LU model
ASILUFC5	ASILUFC51
TCSATV01N2	TCSATV01N2
	Standard Coil S.7.D.F.0 30 mA depending on LU model ASILUFC5

(4) Or direct screw terminal connection to AS-Interface and external supply (AUX).



For dialogue







Control stations	Control stations with 2 pushbuttons					
V2.1	Black and white	Green and red	Green and red illuminated			
Type of addressing	Extended (A/B)	Extended (A/B)	Extended (A/B)			
Supply by AS-Interface	Buttons	Buttons	Buttons and pilot lights			
Supply by external source (AUX)	_	_	_			
AS-Interface profile	S.B.A.E.	S.B.A.E.	S.B.A.E.			
Consumption from AS-Interface	< 45 mA	< 45 mA	< 80 mA			
Dimensions (WxDxH)	68x62x118 mm	68x62x118 mm	68x65x118 mm			
References	XALS2001H	XALS2002H	XALS2003H			
Recommended accessory for connection to AS-Interface cable (5)	TCSATN011F1	TCSATN011F1	TCSATN011F1			

(5) Or direct screw terminal connection to AS-Interface and external supply (AUX).



Interface (6)	For 2 control units and 2 pilot lights
V2.1	
Number of pages available	-
Number of inputs	2
Number of outputs	2 solid state, 0.5 A
Type of addressing	Standard
Supply by AS-Interface	Inputs and pilot lights
AS-Interface profile	S.B.A.E.
Maximum consumption from AS-Interface	80 mA
Dimensions (WxDxH)	52x15x38 mm
References	XALSZ1E

(6) Direct screw terminal connection to AS-Interface or by accessory for flat cable: TCSATN01N2.









Indicator banks, Ø 70 mm (9)	Base units and cover		Illuminated units		Audible
V2.1			"Flash" discharge tube	Steady light	unit
Type of addressing	Standard	Standard	-	_	-
Connection to AS-Interface cable and AUX (male M12 connector)	yes	yes, remote L=1m	-	-	-
Supply by AS-Interface	(7)	(7)	-	_	_
Supply by external source (AUX)	(7)	(7)	-	_	-
AS-Interface profile	S.7.F	S.7.F	-	-	-
Consumption from AS-Interface, supply by AS-Interface / external	250 / 30 mA	250 / 30 mA	-	-	-
Light source	-	-	5 Joule	LED	-
Buzzer	-	-	-	-	7080 dB at 1m
References	XVBC21A	XVBC21B	XVBC6B• (8)	XVBC2B● (8)	XVBC9B
Recommended accessory for connection to AS-Interface cable & AUX	TCSATN011F1	TCSATN011F		_	-

- (7) Illuminated units supplied by AS-Interface or externally, configurable by shunt.
- (8) To complete the reference, replace the by the following number designating the colour: green: 3, red: 4, orange: 5, blue: 6, clear: 7, yellow: 8.
- (9) To obtain a complete indicator bank, order a base unit + the illuminated or audible units (5 units maximum).



AS-Interface _____ Installation system Master modules











					-
Platform	Twido	Premium	Micro	Quantum	Ethernet GW
Maximum number of master modules per PLC	2	2, 4 or 8 depending	1	8 (1)	_
		on processor			
Compatibility with AS-Interface interfaces and components	V1 / V2.1	V1 / V2.1	V1	V1	V1 / V2.1 / V3.0
Direct connection to AS-Interface cable	by terminal block	by terminal block	by terminal block	by terminal block	by terminal block
Maximum number of addresses	62	62	31	31	62
Type of addressing	Standard /	Standard /	Standard	Standard	Standard /
	Extended (A/B)	Extended (A/B)			Extended (A/B)
Compatibility with analogue interfaces	Yes	Yes	_	-	Yes
Compatibility with safety interfaces	Yes	Yes	Yes	Yes	Yes
AS-Interface profile	M.3	M.2.E	M.2	M.2	M.4
References	TWDNOI10M3	TSXSAY1000	TSXSAZ10	140EIA92100	TCSAGEA1SF13F

^{(1) 4} per local rack, 4 per remote I/O, 2 per distributed I/O.

Current in A at 24 V Current in A at 30 V AS-Interface

Power supply units







Type of supply		AS-Interface	AS-Interface	
Input voltage		100240 VAC	100240 VAC	100240 VAC
AS-Interface output voltage		30 VDC	30 VDC	30 VDC
Auxiliary output voltage		-	-	24 VDC
AS-Interface nominal power	AS-Interface nominal power		146 W	73 W
Auxiliary nominal power		-	-	72 W
AS-Interface nominal current		2.4 A	4.8 A	2.4 A
AUX nominal current		-	-	3 A
Direct connection to AS-Interface cable		by terminal block	by terminal block	by terminal block
Dimensions (WxDxH)		54x120x120 mm	81x120x120 mm	81x120x120 mm
References	without earth fault detection	ASIABLB3002	ASIABLB3004	ASIABLM3024
	with earth fault detection	ASIABLD3002	ASIABLD3004	-

⁽²⁾ Power supply unit with constant maximum output, see curve above.

Insulation control relay



Туре	For AS-Interface line
Degree of protection	IP20
Number of C/O contacts	2 relays, each with 1 N/O contact
Rated operational voltage	50 VDC
Dimensions (WxDxH)	90x58x76 mm
References	RM0PAS101 (3)

⁽³⁾ Provided with an impedance adapter.



Cables, repeater and line extension









Туре			Yellow AS-Interface cable	Black Auxiliary cable	Repeater (5)	Line Extension
Wire c.s.a.			2 x 1.5 mm ²	2 x 1.5 mm ²	-	-
References	Cable	L = 20 m	XZCB10201 (4)	XZCB10202 (4)	-	-
		L = 50 m	XZCB10501 (4)	XZCB10502 (4)	-	-
		L = 100 m	XZCB11001 (4)	XZCB11002 (4)	-	-
Reference of repeater			-	-	ASIRPT01	TCSARR011M

⁽⁴⁾ Standard cable. For TPE cable (oil and vapour resistant) add the letter H to the end of the reference, example: XZCB10201 becomes XZCB10201H.

Tap-offs for flat cable

(For connecting interfaces and components)





Connection to ca	able by IDC		AS-Interface		AS-Interface + Auxiliary	
			IP67		IP67	
Connection to the AS	-Interface com	ponent	M12 connector (6)	Bared wires (7)	M12 connector (6)	Bared wires (8)
References	Cable	L = 1 m	TCSATN011F1	_	TCSATV011F1	-
		L = 2 m	TCSATN011F2	TCSATN01N2	TCSATV011F2	TCSATV01N2

- (6) Female 5-pin M12 end connector, screw threaded for connection with M12 male connector.
- (7) 2 x $0.34 \ \text{mm}^2$ for product with terminal block.
- (8) 4 x $0.34 \ \text{mm}^2$ for product with terminal block.

T connectors



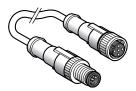
Connection to cable by IDC	T connector	Branch
	AS-Interface IP 67	AS-Interface or
Connection to the AS-Interface sensor or actuator	1 x M12 connector 5-pin female, screw threaded	Extension for 2 flat
References	TCSATN011F	TCSATN02V



Branch
AS-Interface or Auxiliaires IP 67
Extension for 2 flat cables
TOO ITHIONY

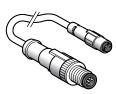
⁽⁵⁾ Enables an AS-Interface network to be extended by 100 m. Direct connection to the AS-Interface yellow cable by IDC

Installation system Jumper cables M12 / M12



Туре		Male / Female jumper cable		
Male connector type, interface sid	е	M12, 3-pin, straight, screw thread.	M12, 4-pin, straight, screw thread.	M12, 5-pin, straight, screw thread.
Female connector type, sensor sid	de	M12, 3-pin, straight, screw thread.	M12, 4-pin, straight, screw thread.	M12, 5-pin, straight, screw thread.
Cable		PUR, black	PUR, black	PUR, black
References Cable	L = 1 m	XZCR1511040A1	XZCR1511041C1	XZCR1511064D1
	L = 2 m	XZCR1511040A2	XZCR1511041C2	XZCR1511064D2

Jumper cables M12 / M8 or DIN







Туре		Male / Female jumper cable		
Male connector type, interface side	e	M12, 3-pin, straight, screw thread.	M12, 3-pin, straight, screw thread.	M12, 3-pin, straight, screw thread.
Female connector type, sensor sid	le	M8, 3-pin, straight (1)	M8, 3-pin, straight, screw thread.	DIN 43650A, elbowed, screw thrd.
Cable		PUR, black	PUR, black	PUR, black
References Cable	L = 1 m	XZCR1501040G1	XZCR1509040H1	XZCR1523062K1
	L = 2 m	XZCR1501040G2	XZCR1509040H2	XZCR1523062K2
(1) Clip together connector				

⁽¹⁾ Clip together connector.

Connectors, splitter box







Туре		Connectors	Pre-wired connectors	Splitter box
Male connector type, interface s	side	M12, 4-pin	M12, 5-pin, straight, screw thread.	1 x M12, 5-pin, straight, screw thrd.
Female connector type, sensor	side	_	_	2 x M12, 5-pin, straight, screw thrd.
Cable		-	PUR, black	_
References	Straight connector, screw thread.	XZCC12MDM40B	_	FTXCY1212
	Elbowed connector, screw thread.	XZCC12MCM40B	_	-
	Cable L = 0.5 m	_	XZCP1564L05	-
	Cable L = 2 m	-	XZCP1564L2	-

Tools

Adjustment and addressing terminals



Display	25 mm LCD screen
Degree of protection	IP40
AS-Interface voltage / current measurement	yes
Addresses stored in memory	yes
Access to functions	direct by selector switch
Compatibility	V1/V2
Operating time	2500 addressing operations
References	ASITERV2
Reference with set of 7 leads + protective cover for terminal	ASITERV2SET

Addressing accessories for terminals ASITERV2 and **XZMC11**





Product connection	Infrared addressing	Socket
For products	ASISSL	ABE8 / APP1 / ASILUF /
		XBZS43 / ASI20M
References	ASITERIR1	XZMG12







Product connection	M12, male	M12, female	Jack plug
For products	(2)	ASI67FMP XVB/XAL/LF	ASI20M / ASI67FFP
References	ASITERACC1M	ASITERACC1F	ASITERACC

⁽²⁾ Possibility to connect AS-Interface cable using T connector TCSATN011F.

Usage guidelines

Selection tables



				1000
1	Modular interface, width 25 mm	Analogue		Digital
2	V2.1 with standard addressing			
3	Number of inputs	2 (010V)	2 (0/420mA)	4
4	Number of outputs	-	-	4 relay, 2A
5	Type of addressing	Standard		
6	Supply by AS-Interface	Inputs and sensor supply (200 mA max.)		
7	Supply by 24 VDC external source (black AUX cable)	-	_	-
8	AS-Interface profile	S.7.3.F.D	S.7.3.F.D	S.7.0.F.E
9	Maximum consumption from AS-Interface (excluding sensor supply)	60 mA	60 mA	110 mA
10	Dimensions (WxDxH)	25x77x87 mm	25x77x87 mm	25x77x87 mm
11	References	ASI20MA2VU	ASI20MA2VI	ASI20MT4I4OF
12	Accessory (1) for connection to flat cables	TCSATN01N2	TCSATN01N2	TCSATN01N2

- 1 Product family, interfaces or components, etc.
- 2 AS-Interface version: (V1 and V2.1 compatibility, see table below).
 - V1 or V1compatible: version enabling mounting of 31 interfaces or components per master module using products with standard addressing. V2.1: version enabling mounting of 31 interfaces or components per master module using products with standard addressing or 62 interfaces or components per master module using products with extended A/B addressing.
 - Diagnostic information, such as a short-circuit on a sensor supply, is signalled to the PLC.
- 3 Each input enables connection of a sensor (detectors, switches, pushbuttons, etc.).
- 4 Each output enables connection of an actuator (contactors, solenoids, pilot lights, etc.).
- 5 Standard addressing: enables connection of 31 interfaces or components. Extended addressing: enables connection of 62 interfaces or components.
- 6 Indicates the circuits that can be supplied directly by the AS-Interface (example: yellow cable).
- 7 Indicates the circuits requiring an external supply source. This voltage can be distributed by the flat black cable.
- 8 The profile is very useful when replacing an existing product and ensures full interchangeability. For V2.1 products, the 3rd character of the profile can be changed by the user using the adjustment or addressing terminal.
- 9 Enables the power of the AS-Interface supply to be established.
- 10 Overall dimensions of product.
- 11 Enables the product to be ordered.
- 12 Accessory best suited for connection of product. Other types of accessory can equally be used.

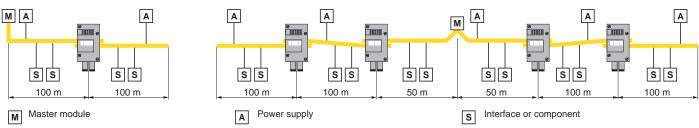
Compatibility between V1, V2.1 and V3.0 master modules and V1 and V2.1 interfaces or components, see master table page 8.

Some AS-Interface rules

Power supply: Never use a standard power supply, only use PELV type power supply units such as those listed on page 8. Calculating the length of the AS-Interface network: Add the length of the yellow cable to 2 x the length of the connection accessories. Example: 50 m yellow cable and 5 tap-offs with 2 m cable (ref. TCSATV011F2) => network length = 50 + 2 x 5 x 2 = 70 m.

It is recommended that unnecessary cable runs are avoided.

The maximum length of the network is 100 m, but this can be extended to 200 m by using 1 repeater or to 300 m by using 2 repeaters (see page 9). By positioning the master module at the centre of the network, it is possible to achieve 500 m. It is not possible to exceed this value using a single master.



The AS-Interface cable:

Preferably use the flat yellow cable and respect the polarities (+ brown, - blue).

However, it is possible to use standard cabling, particularly in enclosures, but ensure that the 2 wires are not twisted in order to avoid reversal of the AS-Interface + and AS-Interface –.



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