

## APPLICATION NOTE: Cable Specifications for SHM installations

AN011

Revision	Date	Change
1	14/01/2014	New issue from earlier spec

### Bus Installation Cables

Function	Type	Size/makeup	Detail	Example supplier code
Modbus	Modbus cable, ref Belden YM29560	1 Pair screened 24AWG	Jacket thickness ensures correct 120Ω impedance 63Kg/Km, O/D 6.7mm	SHM CABMODBUSLSHF
M-Bus <sup>1</sup>	1 Pair, Choosing right cable depends on maximum length required and number of meters.	1 Pair unscreened.	The cable resistance and capacity must be as low as possible. The thicker the cable, the lower the resistance. M-Bus cable must be able to handle min 50V and 500mA	F&S examples 2201PUYH 0.35mm <sup>2</sup> 50Ω/km 1801PUYH 0.79mm <sup>2</sup> 21Ω/km 1601PUYH 1.34mm <sup>2</sup> 12Ω/km (resistance is Cable length, NOT loop resistance, so double the Ω for loop)
Ethernet	Cat-5e	4x2 24AWG	Depending on situation, use screened or unscreened.	Screened F&S C5EFR or C5EFHR LSHF Unscreened F&S C5EHB
RS485	Screened 120Ω impedance	2x2 24AWG (0.22mm <sup>2</sup> )	Used with Elster A1700 RS485 systems	SHM CABRS485

<sup>1</sup>Please see SHM for advice

### Current Transformer cable

If CT cables have to be extended, then the resistance of the cable used must be considered.

A rule of thumb for CTs with 5A secondary, can be extended by up to 10m using 2.5mm<sup>2</sup> cable, if longer use 4.0mm<sup>2</sup>.

Multicore numbered cable is ideal for CT extension.

SHM 1 Amp MiniClip CTs can run much further, and are therefore supplied with longer cables.

Function	Type	Size/makeup	Detail	Example supplier code
CT	LSHF	7x2.5mm <sup>2</sup>	YY numbered 1-6 + Earth	SHM CABCONTROL7x25LSF
CT	LSHF	<sup>2</sup> 4x4.0mm <sup>2</sup>	YY numbered 1-3 + Earth	SHM CABCONTROL4x4LSF

<sup>2</sup>To reduce of cost of cable, it is acceptable to connect all 3 S2's at each end of the earth core – the earth core should have relatively low current in a 3 phase system

## General cables and for UL and J-Loggers

Function	Type	Size/makeup	Detail	Example supplier code
Mains	Conduit cable (single)	24/0.2 (0.75mm <sup>2</sup> )	Tri-Rated	e.g. RS 717-4108
	3-Core	24/0.2 (0.75mm <sup>2</sup> )		RS 775-5858
Pulse / Status inputs	Single pair needed per channel. Screened preferred. If multi-pair, individual screen not needed.	7/0.2 (0.2mm <sup>2</sup> ) 22AWG	Screened multi-pair, or use screened Cat-5e in which case bootlaces are essential due to fine wire	1 pair e.g. F&S 2201POFPH (LSHF)
				Multi-pair Screened Cat-5e F&S C5EFR or LSHF C5EFHR
Analog inputs	Twin-core (Screened)	7/0.2 (0.2mm <sup>2</sup> ) 22AWG	Screened twisted pair	F&S 2201POFPH
RS485 LAN cables	Single Twisted-Pair (Screened)	7/0.2 (0.2mm <sup>2</sup> ) 22AWG	Screened twisted pair, or twin pair	1 pair e.g. F&S 2201POFPH
	Dual Twisted-Pair (Screened)	7/0.2 (0.2mm <sup>2</sup> ) 22AWG	Screened twisted twin pair	2 pair F&S 2202PIFRH
General purpose signal /Data cable	4 x Twisted Pair (foil screened)	24AWG (0.22mm <sup>2</sup> )	Each pair individually foil screened	F&S 2404PIFFH
RS232 serial	9-way D-type. Male-female	9-way D m/f	PC to ULx logger	SHM CAB909
USB/RS232	Use with CAB909	USB/RS232 10cm length	USB to RS232, with Tx Rx indicating LEDs	SHM CAB232

### Notes:

1. LSHF – Low Smoke Halogen Free, in case of fire, this emits minimal levels of toxic fumes.
2. Example cables above are generally low smoking, suitable for riser installation.
3. SHM cables are supplied by the metre.
4. F&S supplies cable by the metre [sales@fscables.com](mailto:sales@fscables.com) 01727 840841.
5. Please contact SHM if exterior, or duct grade cables are needed.