

Installation

Motor Cables - Specification

Shielded motor cabling with EMC rated glands are required for reducing Electro-Magnetic Interference and improving EM Compatibility. Choosing the right motor cable specification is therefore essential. As seen below, standard galvanized steel conduits are not listed by the manufacturer for EMC shielding duty. Conduits with over-braiding are rated as acceptable.

metallic selection application guide

Page number	conduit system	IP rating available	compression strength kg 100mm 20mm nominal size	pull-off strength kg 20mm nominal size	minimum bend radius 20mm nominal size	colours	EMC screening @1MHz
20	FU galvanised steel	IP40	350	120	45	zinc	
20	SSU stainless steel, grade 316	IP40	400	170	45	stainless steel	
22	FSU galvanised steel, pvc coated	IP54, IP65	350	120	45	black, grey orange	?
22	FNU galvanised steel, nylon coated	IP54, IP65	350	120	45	black	
24	LFHU galvanised steel, LFH coated	IP54, IP65	350	120	45	black	
24	FPU galvanised steel, polyurethane coated	IP54, IP65	350	120	45	black	
26	LTP galv steel, pvc coated, liquid tight	IP66, IP67, IP68, IP69K	400	130	65	black, grey orange	
34	FSB galv steel, pvc, galv steel overbraid	IP54, IP65	350	120, 300	45	zinc	55dB
34	LFHUBRD galv steel, LFH coated, SS316 overbraid	IP54, IP65	350	120, 300	45	stainless steel	49dB
36	FB galvanised steel, galv steel overbraid	IP40	350	120	45	zinc	55dB
36	FUSSB galvanised steel, SS316 overbraid	IP40	350	120	45	stainless steel	49dB
38	LTPBRD galv steel, rubber coated, SS316 overbraid	IP66, IP67, IP68, IP69K	400	350	65	stainless steel	49dB
40	FPRSS PA6 corrugated, SS316 overbraid	IP67	75	100	45	stainless steel	49dB
40	FPRTC PA6 corrugated, finned copper overbraid	IP67	75	75	45	tin	67dB
40	FPISS PA12 corrugated, SS316 overbraid	IP67	45	100	45	stainless steel	49dB
40	FPIHSS PA12 corrugated, SS316 overbraid	IP67	60	100	45	stainless steel	49dB

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Power Cabling Practice



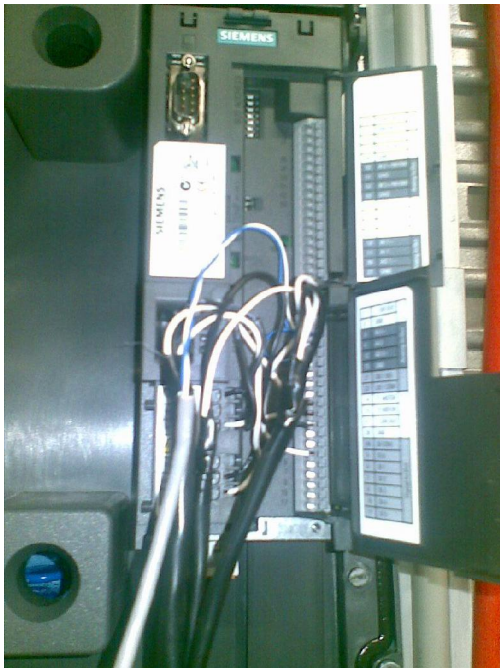
Good: Ferrite rings fitted & EMC rated glands used with shielded motor cable. Separate thermistor cabling.
Bad: Cable loops and no bonding to the backplane using the metal straps provided with the drive.



Left: This shows the minimum power wiring requirements for a Category 2 (Class A) installation. The strap is used to provide a good EMC bond between the motor cable and the drive, while the nylon glands maintain the IP55 rating. For Category 1 (Class-B) installations you must use EMC rated glands and the ferrite rings included with the drive. Note an additional earth bonding cable may be necessary.

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Signal Cabling Practice



Good: individual shielded signal cabling used to separate the analog inputs, digital inputs, and the status relay outputs.

Bad: Forgot to use the included cable termination plate that is supplied with the drive.

Right: Use the cable termination plate that is supplied with the drive to manage the separation of signal cables from power cables. This also allows for correct bonding of the shield when connecting sensors directly to the drive, e.g. when using the drive's internal PID loop to control cooling towers and stairwell pressurisation systems.



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Cable Separation Practice



Good: A wide cable tray allows a reasonable distance to separate signal cables from power cables. Best practise is to keep 250mm clearance. Having the motor cable cross the supply cables at 90 degrees minimises any noise coupling.

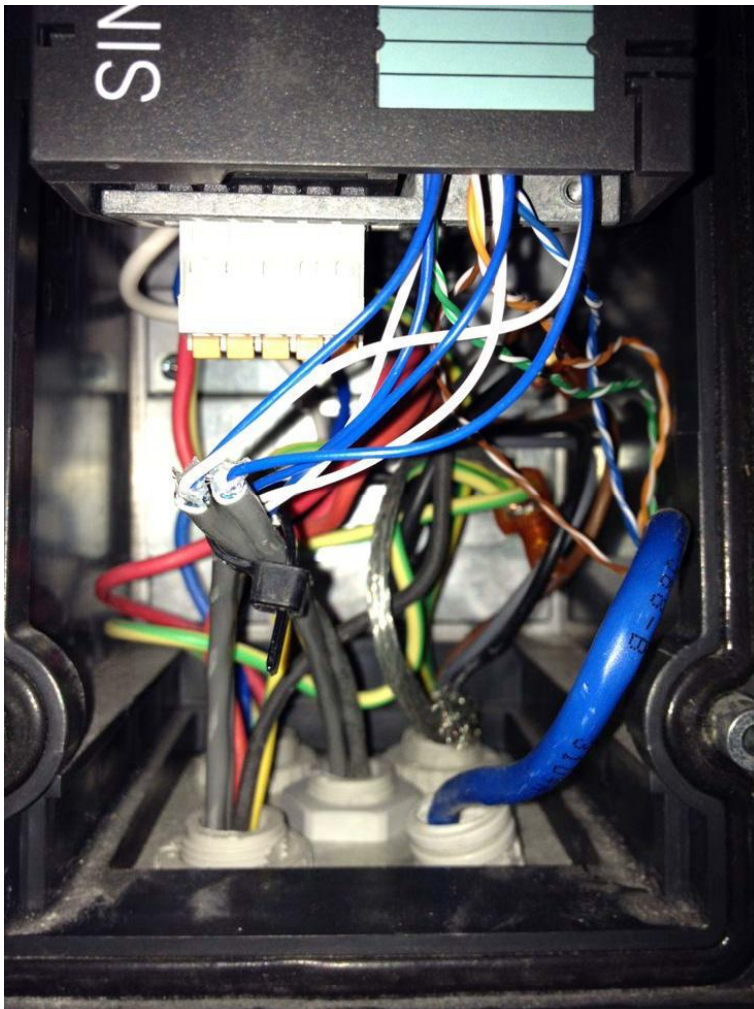
Bad: Strapping the most sensitive signal cables to the motor cable – which is the worst EMF noise emitter in the area.

Even the best quality shielded cables have a leakage factor that demands a physical separation between power and low level signals be observed.

Installation

Example of what not to do...

Below is an example of how not to install a drive. There are multiple problems here that could cause issues with control accuracy, EMC compliance, and perhaps even drive longevity.



The Good, Bad, & the Ugly
Good: The G120P still performed the task.

Bad: - see following list.

Motor cable shield is terminated with a connector and earth wire, which provides very poor EMC bond. Metal straps thrown away. No sign of EMC glands. Ferrite rings thrown away.

No separation of any cabling. Signal termination plate thrown away.

Sensor signal shields not connected anywhere.

Cat-5 cable used for Fire Stop and Run modes.

No cable glands used, so IP rating reduced to that of corrugated conduits.

The Ugly: Self evident...