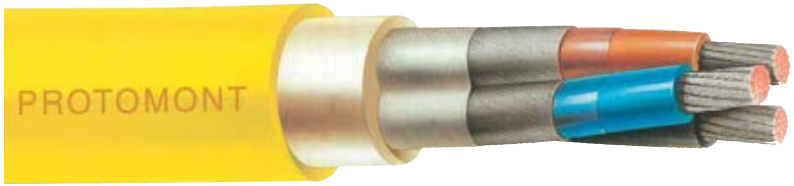
Extra heavy duty flexible mining cables



APPLICATION

- Above ground mining of coal, iron ore and uranium
- Quarries
- Construction & heavy industry
- Drills, pumps & cutters
- Conveyors
- Suitable for submersible application

The cables are suitable for fixed installation and flexible operation as power supply cables to motors, distribution boards, etc., for underground mining applications, for tunnel building applications, for opencast mining applications, for use in quarries and similar applications.

DESIGN

PROTOMONT heavy duty cables combine flexibility with toughness to provide long service life in aggressive operating conditions.

Finely stranded tinned copper conductors are rope laid to form a flexible construction. R-EP-90 elastomer insulation offers a high insulation resistance and excellent current carrying capacity. Each power core has a concentric screen of tinned copper wires and the entire conductor assembly is bound together with a textile tape. Both the elastomer inner sheath and heavy duty PCP outer sheath protect the cable from mechanical damage. Control cores, when required, are laid up in the three interstices outside the screens.

PROTOMONT XHD – Rubber-Sheathed Flexible Cable

OPERATING TEMPERATURES

- Ambient temperature
  - Fully flexible operation 25°C to +80°C
  - Fixed installation 40°C to +80°C
- Maximum permissible conductor temperature 90°C
- Maximum permissible short circuit temperature 250°C

MINIMUM BENDING RADII

The following minimum recommended bending radii should be observed to ensure operating reliability.

- For fixed installation 4 x cable diameter
- When freely flexing 5 x cable diameter

CURRENT CARRYING CAPACITY

Current ratings are based on a continuous operating ambient temperature of 40°C. At other temperatures these values must be converted using the following table.

°C	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Factor	1.26	1.20	1.15	1.10	1.05	1.00	0.94	0.88	0.81	0.73	0.65	0.57	0.47	0.34

Accordance with AS/NZS 3008.1.1.2017.

TENSILE STRENGTH

The maximum allowable tensile stress on the conductors is 15N/mm^2. This ensures no conductor damage will occur in operation.

VOLTAGE RATING

- Rated Voltage: *Uo/U* = 0.6/1kV
- Maximum operating voltages in:
  - 3 phase AC operation *Uo/U* = 0.7/1.2kV
  - DC operation *Uo/U* = 0.9/1.8kV
- AC test voltage = 3kV (5 min)

CORE COLOUR IDENTIFICATION

3 core : blue, brown & black
Pilots : blue, brown & black
5 core : black, blue, black, brown, black

CABLE DESCRIPTION

Protomont has a particular description to detail its construction fully.
eg., 3 x 25 + 3 x 16/3E indicates 3 power cores each
25 mm2 and 3 split earth screens (one over each power core)
totaling 16 mm^2.
+ 3 x 2.5 indicates 3 insulated control cores.

Conductor size	Reactance at 50Hz	Impedance at 90°C	Inductance	Capacitance
mm^2	Ω/km	Ω/km	mH/km	µF/km
4	0.1080	6.310	0.290	0.380
6	0.1030	4.310	0.270	0.440
10	0.0936	2.440	0.370	0.480
16	0.0887	1.540	0.250	0.570
25	0.0871	0.995	0.250	0.600
35	0.0839	0.707	0.240	0.690
50	0.0832	0.493	0.240	0.720
70	0.0800	0.348	0.230	0.840
95	0.0796	0.264	0.230	0.860
120	0.0774	0.207	0.230	0.960
150	0.0775	0.167	0.230	1.110
185	0.0771	0.138	0.230	1.190
240	0.0764	0.106	0.225	1.33
300	0.0761	0.086	0.223	1.44

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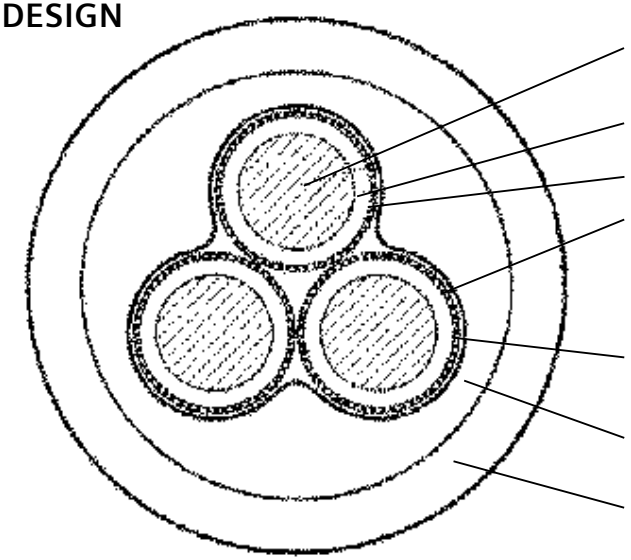
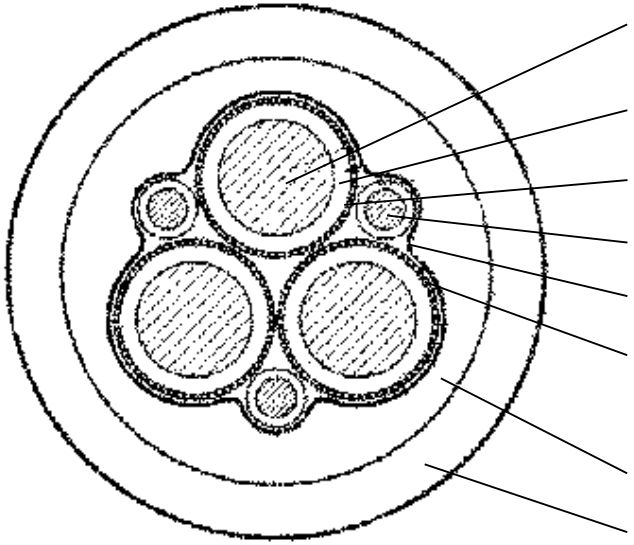
DESIGN



5DM4 – Protomont 3 screened Power Cores



5DM4 – Protomont 3 screened Power Cores including 3 control cores

PROTOMONT XHD – Rubber-Sheathed Flexible Cable

Selection and ordering data

Current ratings are based on AS/NZS 3008.1.1:2017.

	No. of cores conductor size	Part No.	Nominal No. of strands and strand diameter	Nominal conductor diameter guidance	Nominal cable diameter	Approx. cable weight	Current carrying capacity Unenclosed Spaced 
	mm^2		mm	mm	mm	kg/km	A
PROTOMONT Untinned 3 Screened Power Cores	3 x 1.5 + 3 x 1.5/3E	5DM4 604	30 x 0.25	1.6	13.3	250	20
	3 x 2.5 + 3 x 2.5/3E	5DM4 605	50 x 0.25	2.1	14.4	345	27
	3 x 4 + 3 x 4/3E	5DM4 606	56 x 0.30	2.6	17.1	466	36
	3 x 6 + 3 x 6/3E	5DM4 607	84 x 0.30	3.2	18.4	560	46
	3 x 10 + 3 x 10/3E	5DM4 610	80 x 0.40	4.2	21.3	751	66
	3 x 16 +3 x 16/3E	5DM4 612	126 x 0.40	5.3	24.9	1100	87
	3 x 25 + 3 x 16/3E	5DM4 613	196 x 0.40	6.6	29.2	1565	116
	3 x 35 + 3 x 16/3E	5DM4 614	276 x 0.40	7.8	31.6	1935	144
	3 x 50 + 3 x 25/3E	5DM4 615	396 x 0.40	9.3	38.0	2725	182
	3 x 70 + 3 x 35/3E	5DM4 616	546 x 0.40	10.9	42.1	3725	230
	3 x 95 + 3 x 50/3E	5DM4 617	724 x 0.40	12.6	47.0	4725	275
	3 x 120 + 3 x 70/3E	5DM4 618	926 x 0.40	14.2	53.9	5905	327
	3 x 150 + 3 x 70/3E	5DM4 620	1156 x 0.40	15.9	58.2	7275	375
	3 x 185 + 3 x 95/3E	5DM4 627	1406 x 0.40	17.5	64.8	9025	428
PROTOMONT Control Cores Overall Screened	1 x (2 x 1.5)C	5DL4 052	30 x 0.25	1.6	12.3	166	20

PROTOMONT XHD – Rubber-Sheathed Flexible Cable

Selection and ordering data

Current ratings are based on AS/NZS 3008.1.1:2017.

	No. of cores conductor size	Part No.	Nominal No. of strands and strand diameter	Conductor diameter guidance (max value)	Nominal cable diameter	Approx. cable weight	Current carrying capacity Unenclosed Spaced 
	mm^2		mm	mm	mm	kg/km	A
PROTOMONT Untinned 3 Screened Power Cores including 3 Control Cores	3 x 2.5 + 3 x 2.5/3E + 3 x 1.5 ST	5DM4 624	50 x 0.25	2.1	18.1	510	27
	3 x 4 + 3 x 4/3E + 3 x 1.5 ST	5DM4 626	56 x 0.30	2.6	18.8	552	36
	3 x 6 + 3 x 6/3E + 3 x 1.5 ST	5DM4 630	84 x 0.30	3.2	19.4	628	46
	3 x 10 + 3 x 10/3E + 3 x 2.5 ST	5DM4 631	80 x 0.40	4.2	23.1	934	66
	3 x 16 + 3 x 16/3E + 3 x 2.5 ST	5DM4 632	126 x 0.40	5.3	24.9	1175	87
	3 x 25 + 3 x 16/3E + 3 x 2.5 ST	5DM4 633	196 x 0.40	6.6	29.2	1640	116
	3 x 35 + 3 x 16/3E + 3 x 2.5 ST	5DM4 634	273 x 0.40	7.8	31.6	2010	144
	3 x 50 + 3 x 25/3E + 3 x 2.5 ST	5DM4 635	396 x 0.40	9.3	38.0	2800	182
	3 x 70 + 3 x 35/3E + 3 x 2.5 ST	5DM4 636	546 x 0.40	10.9	42.1	3800	230
	3 x 95 + 3 x 50/3E + 3 x 2.5 ST	5DM4 637	724 x 0.40	12.6	47.0	4800	275
	3 x 120 + 3 x 70/3E + 3 x 2.5 ST	5DM4 638	926 x 0.40	14.2	53.9	5980	327
	3 x 150 + 3 x 70/3E + 3 x 2.5 ST	5DM4 642	1156 x 0.40	15.9	58.2	7350	375
	3 x 185 + 3 x 95/3E + 3 x 2.5 ST	5DM4 644	1406 x 0.40	17.5	64.8	9100	428
PROTOMONT Tinned 3 Screened Power Cores including 3 Control Cores	3 x 2.5 + 3 x 2.5/3E + 3 x 1.5 ST	5DM4 724	50 x 0.25	2.1	19.0	520	27
	3 x 4 + 3 x 4/3E + 3 x 1.5 ST	5DM4 726	56 x 0.30	2.6	19.8	600	36
	3 x 6 + 3 x 6/3E + 3 x 1.5 ST	5DM4 730	84 x 0.30	3.2	20.5	670	46
	3 x 10 + 3 x 10/3E + 3 x 2.5 ST	5DM4 731	80 x 0.40	4.2	24.5	1010	66
	3 x 16 + 3 x 16/3E + 3 x 2.5 ST	5DM4 732	126 x 0.40	5.3	28.0	1290	87
	3 x 25 + 3 x 16/3E + 3 x 2.5 ST	5DM4 733	196 x 0.40	6.6	32.0	1780	116
	3 x 35 + 3 x 16/3E + 3 x 2.5 ST	5DM4 734	273 x 0.40	7.8	36.0	2300	144
	3 x 50 + 3 x 25/3E + 3 x 2.5 ST	5DM4 735	396 x 0.40	9.3	42.0	3200	182
	3 x 70 + 3 x 35/3E + 3 x 2.5 ST	5DM4 736	546 x 0.40	10.9	45.5	4010	230
	3 x 95 + 3 x 50/3E + 3 x 2.5 ST	5DM4 737	724 x 0.40	12.6	52.0	5100	275
	3 x 120 + 3 x 70/3E + 3 x 2.5 ST	5DM4 738	926 x 0.40	14.2	57.5	6510	327
	3 x 150 + 3 x 70/3E + 3 x 2.5 ST	5DM4 742	1156 x 0.40	15.9	63.5	7600	375
	3 x 185 + 3 x 95/3E + 3 x 2.5 ST	5DM4 744	1406 x 0.40	17.5	68.5	9400	428