

Technical Note 172

36-Core Multicore Cable for Traffic Signal Installations

April 2017

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1 Introduction

This technical note demonstrates the details and typical connections of 36-core multicore cables for new traffic signal installations of the Department of Transport and Main Roads.

The document also provides the general guideline for replacing damaged 29-core multicore cables with 36-core ones under two specific scenarios.

All 36-core multicore cables must comply with the requirements specified in MRTS 256 *Power Cables* and AS/NZS 2276.1:2004.

The technical note does NOT cover the requirements for Safety and Risk Management and shall be read in conjunction with *Electrical Safety Act 2002*, *Electrical Safety Regulation 2013*, *Manual of Uniform Traffic Control Devices (MUTCD) Part 3* and MRTS256 *Power Cables* as appropriate.

2 Referenced documents

Table 2 below lists referenced documents in the technical note.

Table 2 – Referenced documents

Reference	Title
AS/NZS 2276.1:2004	<i>Cables for Traffic Signal Installations</i>
MRTS256	<i>Power Cables</i>
SD1407	<i>Traffic signals - Traffic signal terminal panel for joint use poles</i>
SD1413	<i>Traffic signals - Mast arm traffic signal junction box (type A)</i>
SD1635	<i>Traffic signals - Traffic signal upper mounting assembly and split shell assembly</i>
SD1670	<i>Traffic signals - Traffic signal wiring connections</i>
SD1699	<i>Traffic signals/Road lighting/ITS - Parts list</i>

3 36-Core Multicore Cable for Traffic Signal Installations

3.1 General

The multicore cables for traffic signal installations of the department have changed from 29-core to 36-core for the purpose of modifying traffic signals as well as repairing cable damage. Accordingly, Joint Use Pole Traffic Signal terminal assembly (refer to SD1407), Mast Arm Traffic Signal terminal assembly (refer to SD1413) and Upper Mount Assembly (UMA) terminal assembly (refer to SD1635) have also been modified in order to cater for additional cores. The details of approved products are shown in Table 1 of SD1699 *Traffic signals/Road lighting/ITS – Parts list*.

Table 3.1 - Part No. for Cable and Terminal Assembly

Item Description	Part No.
36-Core Multicore Traffic Signal Cable	032
Upper Mount Assembly (UMA)	775
Joint Use Pole Traffic Signal Terminal Assembly	512
Mast Arm Traffic Signal Junction Box	523

3.2 Cable Details and Typical Connections for New Traffic Signal Installations

The details and typical connections for new traffic signal installations are illustrated in Table 3.2. The 36-core multicore cable consists of 27 white cores for Traffic Lanterns, 4 purple cores for Push-Buttons, 1 red core for Lamp Active, 1 orange core for Dimming Control, 1 grey core for Extra Low Voltage (ELV) Return, 1 black core for Neutral and 1 green/yellow core for Earth.

Table 3.2. - Details and Typical Connections of 36-Core Cable for New Traffic Signal Installations

36 CORE MULTICORE CABLE							
Cable Details and Typical Connections							
Core Details				Typical Function			
Core Marking	Insulation Colour	Text Colour	CSA	Controller Terminal	Finial (UMA) Terminal	Signal Group	Use
1	White	Black	1.5 mm ²	A5	1	SG1	R
2	White	Black	1.5 mm ²	A4	2		Y
3	White	Black	1.5 mm ²	A3	3		G
4	White	Black	1.5 mm ²	A8	4	SG2	R
5	White	Black	1.5 mm ²	A7	5		Y
6	White	Black	1.5 mm ²	A6	6		G
7	White	Black	1.5 mm ²	A11	7	SG3	R
8	White	Black	1.5 mm ²	A10	8		Y
9	White	Black	1.5 mm ²	A9	9		G
10	White	Black	1.5 mm ²	A14	10	SG4	R
11	White	Black	1.5 mm ²	A13	11		Y
12	White	Black	1.5 mm ²	A12	12		G
13	White	Black	1.5 mm ²	B5	13	SG5	R
14	White	Black	1.5 mm ²	B4	14		Y
15	White	Black	1.5 mm ²	B3	15		G
16	White	Black	1.5 mm ²	B8	16	SG6	R
17	White	Black	1.5 mm ²	B7	17		Y
18	White	Black	1.5 mm ²	B6	18		G
19	White	Black	1.5 mm ²	B11	19	SG7	R
20	White	Black	1.5 mm ²	B10	20		Y
21	White	Black	1.5 mm ²	B9	21		G
22	White	Black	1.5 mm ²	B14	22	SG8	Don't Walk
23	White	Black	1.5 mm ²	B12	23		Walk
24	White	Black	1.5 mm ²	C5	24	SG9	Don't Walk

36 CORE MULTICORE CABLE							
Cable Details and Typical Connections							
Core Details				Typical Function			
Core Marking	Insulation Colour	Text Colour	CSA	Controller Terminal	Finial (UMA) Terminal	Signal Group	Use
25	White	Black	1.5 mm ²	C3	25		Walk
26	White	Black	1.5 mm ²	C8	26	SG10	Don't Walk
27	White	Black	1.5 mm ²	C6	27		Walk
	Red		1.5 mm ²	A2	A	240Vac	Lamp Active
	Orange		1.5 mm ²	X~	X	42Vac	Dimming
	Black		4.0 mm ²	A1	N	240Vac	Neutral
1	Purple	White or Black *	1.5 mm ²	E5	P1	Ped 1	ELV Input
2	Purple	White or Black *	1.5 mm ²	E6	P2	Ped 2	ELV Input
3	Purple	White or Black *	1.5 mm ²	E7	P3	Ped 3	ELV Input
4	Purple	White or Black*	1.5 mm ²	E8	P4	Ped 4	ELV Input
	Grey		2.5 mm ²	E3	PR	ELV Return	ELV Return
	Green / Yellow		6.0 mm ²	Earth bar	Earth bar	Earth	Earth

Notes:

1. All unused cores **must** be tied to earth in the controller.
2. ~ **must** be tied to earth in the controller for future use.
3. * Text on purple cores can be either black or white to maximise contrast between the text and the insulation.

One of the advantages of replacing 29-core cable with 36-core cables is that the cores for Traffic Signals and Push-Buttons are segregated due to the arrangement of terminals and can be easily recognised due to the colouring of insulation.

Another advantage is that 36-core cables have larger cross-sectional area of the Neutral and Earth conductors (4.0 mm² and 6.0 mm² respectively) compared to 29-core cables (2.5 mm² and 2.5 mm² respectively), resulting in decrease in voltage drop in the neutral conductor, reduced fault loop impedance and lowered touch potential. However, as the cross-sectional area of the Neutral is smaller than that of Earth, fault loop impedance calculation and measurement shall be carried out for the neutral conductor to insure the protection device would clear a phase to neutral fault.

4 Replacement of damaged 29-Core Cables

This section provides guidance to repair the damaged 29-core cables for existing traffic signal installations owned by TMR. The wiring changes for 36-core multicore cables that replace damaged 29-core multicore cables are demonstrated in Table 4. The table also covers the wiring details for 29-core cables on new UMA when existing cables are retained.

Table 4 - Two Scenarios of replacement of damaged 29-Core Cables ¹

Scenario 1: Knockdown where the old UMA is replaced by new UMA			
Retained 29 core cable	Termination on new UMA	New 36 core cable	Termination on new UMA
Cores 1-26	Terminals 1-26	Cores 1-26	Terminals 1-26
		Core 27	*
Grey	Terminal 27	Grey	Terminal 27
Black	Terminal N	Black	Terminal N
Green/yellow	Terminal green/yellow	Green/yellow	Terminal green/yellow
		Red	*
		Orange	*
		Cores P1-4	*

Scenario 2: Faulty cable only, no knockdown, where the old UMA is retained			
Retained 29 core cable	Termination on old UMA	New 36 core cable	Termination on old UMA
Cores 1-26	Terminals 1-26	Cores 1-26	Terminals 1-26
		Core 27	*
Grey	Terminal 27	Grey	Terminal 27
Black	Neutral link	Black	Neutral link
Green/yellow	Earth link	Green/yellow	Earth link
		Red	*
		Orange	*
		Cores P1-4	*

Notes:

- All the cores must be connected in the way specified in the table in order to align with the existing connection sheets signed by an electrical RPEQ.
- * All of these unused cores must be terminated into a single screw insulated electrical connector at each end of the cable. These unused cores must be bond to earth at the cable end closer to the controller.

