Delta ARD4

RMS Mors Smitt
A Wabtec company

AUXILIARY | TRIPPING | SUPERVISION

High Performance Auxiliary Relays

The ARD4 is a compact high performance electro-mechanical auxiliary relays for power utility protection and control applications.

- Self-reset and latching versions
- Less than 25ms operate time
- Four heavy duty contacts with magnetic blowouts
- Hand reset flag
- Surface or rail mount
- Flush panel or rack mount
- Made in Australia

Functional Description

ARD4

Features

- Less than 25ms operate time
- 4 heavy duty contacts
- Magnetic arc blowouts standard
- Self-reset contact version
- Latching contact version with hand and electrical reset
- Hand-reset electro-mechanical flag
- Rated operate voltages available for 24, 30/32, 48, 110, 125, 220, 240 or 250 Volts DC nominal auxiliary supplies
- Panel, rack or rail mount options
- Compact size 2, 2U high case
- Plug-in terminal block
- M4 screw terminals
- Relay operate LED standard

Description

The Delta ARD4 is a high performance electro-mechanical auxiliary relay for power utility protection and control applications.

The ARD4 is built on the Delta relay platform providing high performance and reliability while reducing production and supply lead times.

Application of the Delta ARD4 multi-contact auxiliary relays ensure operation in less than 25 ms.

Model Designation

DELTA ARD4 MODELS:

- ARD4-1 Self-Reset Contacts and Hand Reset Flag
- ARD4-4 Hand and Electrical Reset Contacts and Hand Reset Flag

Application

The Delta ARD4 relay provides a robust and reliable interface between protection and control system circuits.

A more economical alternative to traditional auxiliary relays the Delta ARD4 provides a compact, flexible and high-performance solution while meeting relevant IEC standards.

A wide voltage range and standard hand reset flag reduces the number of model variations. The Delta range is packaged in a size 2, 2U high case that may be flush panel, rack or rail mounted.

A plug-in terminal block is provided to allow panel pre-wiring.

Where more than 4 contacts are required refer to the Alpha Range Technical Bulletin.

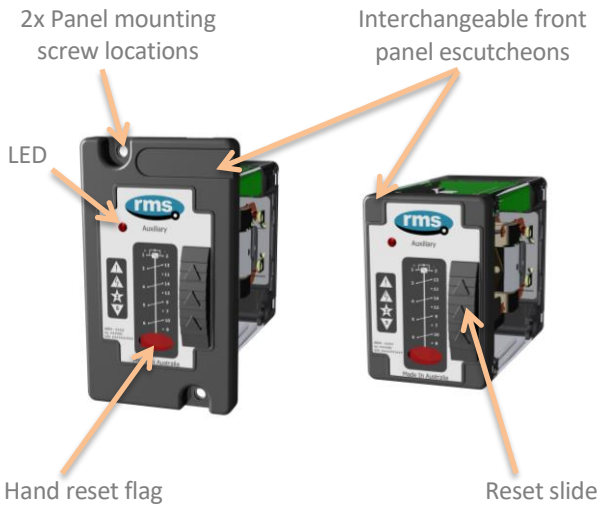
Front Panel Layout

Figure: 1: ARD4 front panel
Left – Panel mount Right – rail mount

Front Panel Configuration

Delta relays can be easily converted from a rail mount to a flush mount configuration. This is achieved by un-clipping the front rail mount escutcheon, securing a metal panel mount plate with four (4) screws and clipping on a panel mount escutcheon. This process may be reversed to convert from a panel mount to a rail mount version.

Delta relays may be ordered with the desired configuration or converted by the user using one of the conversion kits listed in the ordering section.



Coil Operation LED

A front panel LED is provided to indicate when a voltage is applied to the operate coil terminals.

Contact Configuration

Self-reset contacts:	4 C/O
Latching contacts:	3 C/O + 1 N/O

Self-Reset Contacts

All contacts operate when a voltage in the specified range is applied to the relay coil and reset when this voltage is removed.

Hand and Electrical Reset Contacts

All contacts operate and mechanically latch when a voltage in the specified range is applied to the relay coil. The contacts reset when the reset button located on the front of the relay is pressed. A voltage applied to the reset coil may also be used to reset the contacts.

Care should be taken to avoid holding the Contact Hand Reset actuator in the reset position during the presence of a relay operate signal.

Hand Reset Flag

A high visibility mechanical flag drops when the contacts are first operated and remains visible until it is manually hand reset using the reset slide button located on the front of the relay. Note that this flag will only remain reset with the contacts are in the reset position.

Electrical Reset Interlock

In traditionally designed tripping relays, if the reset circuit is held energized while the relay operate input also remains energized, the relay will oscillate between the operated and reset states. The reset interlock feature eliminates this condition and protects the relay from thermal damage by locking out the reset command when a relay operate voltage is applied.

Magnetic Arc Blowouts

Magnetic arc blowouts are a standard feature on all Delta ARD4 relays. Their fitment provides greatly enhanced switching capabilities for inductive DC loads by extinguishing the electrical arcs initiated when the load is broken.

Operating Time

Make contacts: <25 ms to first touch at nominal rated operating voltage.

Break contacts: <20 ms transition

Burden

Average burden at nominal	
Operate coil	3 W maximum
Reset coil	3 W maximum

Pickup Operating Voltage

Guaranteed operation between 80% and 120% of nominal rated DC operating voltage.

Reset Voltage

Self-reset relays will reset at not less than 10% of nominal rated operate voltage. Reset typically occurs at 20% of nominal.

Coil Thermal Rating

All operate, reset and time delayed circuits are designed to withstand continuous application of 120% of the nominal rated voltage.

Electrical Reset

Reset voltage: As per rated pickup voltage.

Reset cut off: Instantaneous with main relay reset.

Contact Ratings

Contact material		Ag
Operating Voltage		Voltage free
Isolation across open contacts		1 kV rms
Make and carry		10 A continuous
Peak inrush current		200 A
AC break capacity (rated load)	AC1	10A / 230 V
DC break capacity (rated load)	DC1	7A / 110 V
	L/R = 40ms	3A / 110 V 1A / 220 V
Switching voltage:	Maximum Minimum	300 V dc / 440 V ac 12 V
Minimum switching current		10mA

Terminal Block

TBD-R1 / R2 Rear connect terminal block
Suitable for flush mount relay version

TBD-F Front connect terminal block
Suitable for rail mount relay version

ATMOSPHERIC ENVIRONMENT

Temperature

Standard	IEC 60068-2-1, IEC 60068-2-2	
Test Identification	Test specification	Auxiliary power Supply voltage
Operating Range	-10 to +55°C	Min and Max
Storage Range	-25 to +70°C	Non-energized
Test duration	16 hours at top and bottom temperatures	

Damp Heat (Humidity)

Standard	IEC 680068-2-78 ENA TS 48-5, Issue 3, 2010
Test Identification	Test specification
Operating Range	40°C and 93% RH non condensing
Test duration	16 hours

IP Rating

Standard	IEC 60529 ENA TS 48-5, Issue 3, 2010
Test Identification	Test specification
Installed	IP5x

MECHANICAL ENVIRONMENT

Vibration - Sinusoidal

Standard	IEC 60255-21-1 Class 1	
Test Identification	Test specification	Variation
Vibration Response in each of 3 axes	0.035 mm/0.5 gn peak 1 sweep cycle 10-150 Hz	≤5%
Vibration Endurance in each of 3 axes	1.0 gn peak 20 sweep cycles 10-150 Hz	Non-energized

Shock and Bump

Standard	IEC 60255-21-2 Class 1	
Test Identification	Test specification	Variation
Shock Response in each of 3 axes	5 gn, 11 ms, 3 pulses in each direction	≤5%
Shock Withstand in each of 3 axes	15 gn, 11 ms, 3 pulses in each direction	Non-energized
Bump Test in each of 3 axes	10 gn, 16 ms, 1000 bumps in each direction	Non-energized

Seismic

Standard	IEC 60255-21-3 Class 1	
Test Identification	Test specification	Variation
Seismic Response Horizontal, on each axis	3.5 mm/1.0 gn, 1 sweep cycle 1-35Hz	≤5%
Seismic Response Vertical	1.5 mm/0.5 gn, 1 sweep cycle 1-35Hz	≤5%

Contact Mechanical Endurance

Standard	IEC 60255-1, #6.11	
Test Identification	Repetition rate	Operations
Durability at full load	0.1 Hz maximum	>10,000
Durability at no load	0.1 Hz maximum	>100,000

ELECTRICAL ENVIRONMENT

Clearances and Creepage Distances

Standard	IEC 60255-26, #10.6.3
Test Identification	Test specification
Pollution degree	2
Overvoltage category	III
Rated insulation voltage	300 V d.c.
Clearances and Creepage Compliance	CAD drawings assessment

Safety-related Electrical tests

Standard	IEC 60255-27, #10.6.4
Test Identification	Test specification
Between Independent Circuits	5 kV 1.2/50 µs 0.5 J 3 pulses of each polarity
	2.0 kV ac rms for 1 minute
Any Terminal and Earth	5 kV 1.2/50 µs 0.5 J 3 pulses of each polarity
	2.0 kV ac rms for 1 minute
Across Normally Open Contacts	1 kV ac rms for 1 min

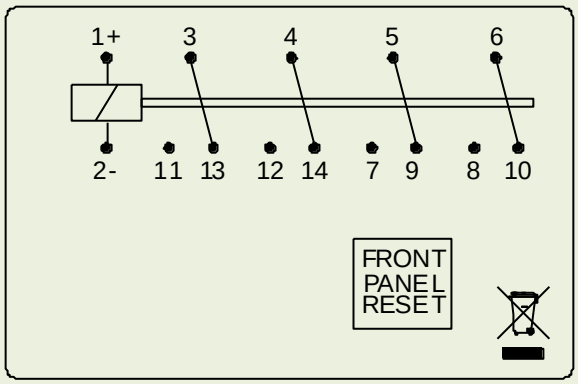
Electrical Environment and Flammability

Standard	IEC 60255-27, #10.6.5
Test Identification	Test specification
Single-fault condition	Assessment for Opened and Closed circuit cases
Maximum temperature of accessible parts at ambient temperature +40°C	< 80°C
Flammability of insulating materials, components and fire enclosures	Assessment

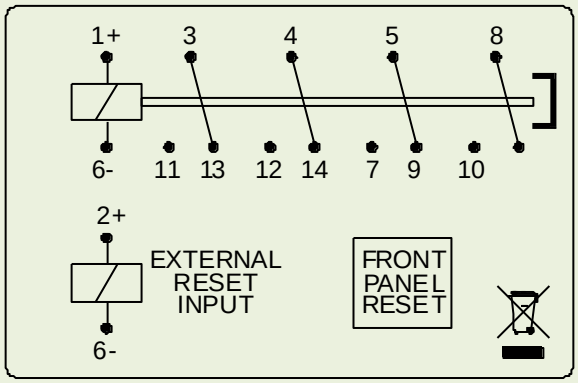
Reverse Polarity and Slow Ramp Test

Standard	IEC 60255-27, #10.6.6
Test Identification	Test specification
Maximum voltage d.c.	V start-up + 20%
Minimum voltage d.c.	V shutdown - 20%
Ramp down/up gradient	1 V/min

ARD4-1 Self-Reset Contacts and Hand Reset Flag



ARD4-4 Hand and Electrical Reset Contacts and Hand Reset Flag



19 Inch Rack Mount Rear Connect (TBD-R Terminal Block)

19 inch rack mount
2U x 2U

Adapter plate for 2x units
in a 2U x 4U rack frame

Adapter plate for 4x units
in a 4U x 4U rack frame

Surface Mount Rear Connect (TBD-R Terminal Block)

Panel cut-out to mount surface rear
connect base

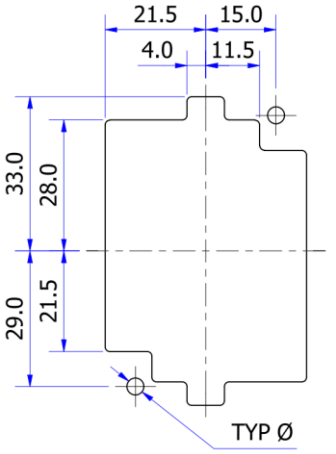
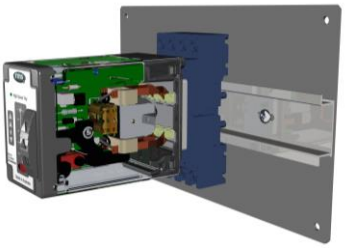
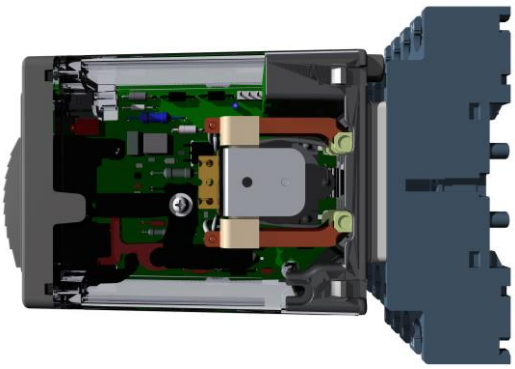


TABLE 1 - HOLE DIA	
PANEL THICKNESS (T)	HOLE DIA (Ø)
1mm < T < 2mm	3.6mm
T > 2mm	3.7mm

Surface or Rail Mount Front Connect (TBD-F Terminal Block)





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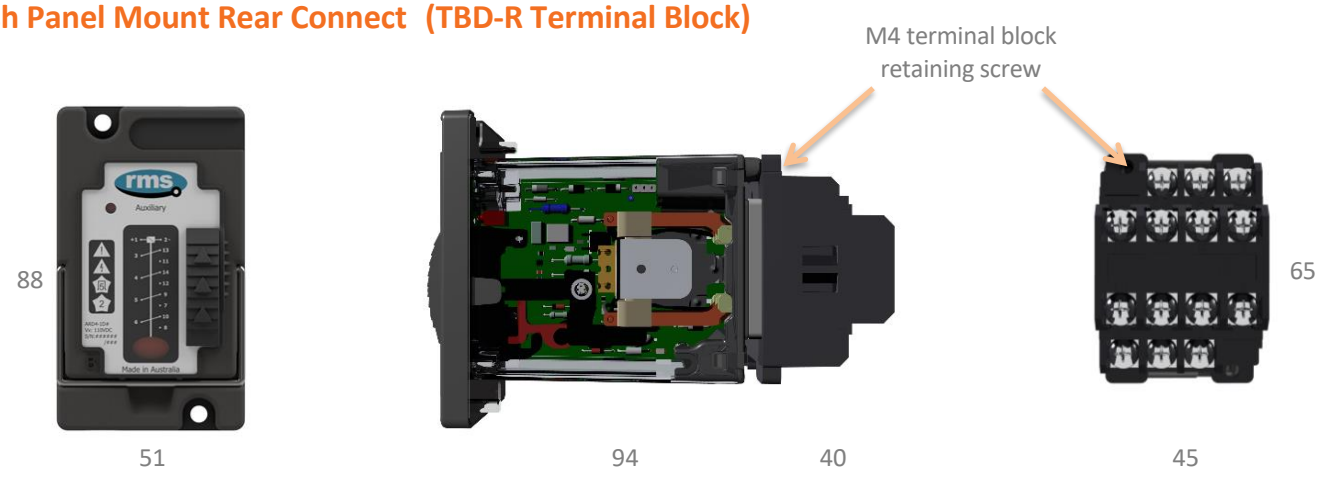
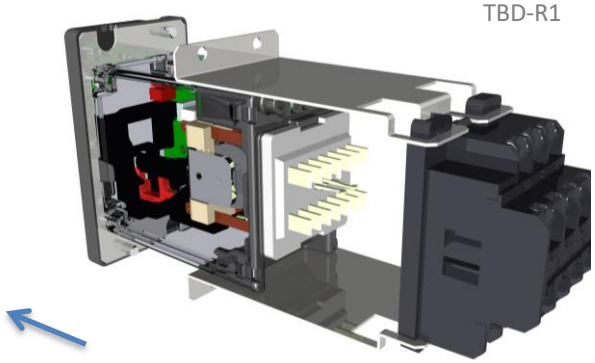
Flush Panel Mount Rear Connect (TBD-R Terminal Block)



Outer dimensions in mm (Approx.)

Plug-in rear terminal block
TBD-R1

Flush panel mounting
Rear connect terminal block



Rear connect terminal base secured to the front panel with optional retention plates - TBD-R2. Relay shown partially drawn-out of the panel.

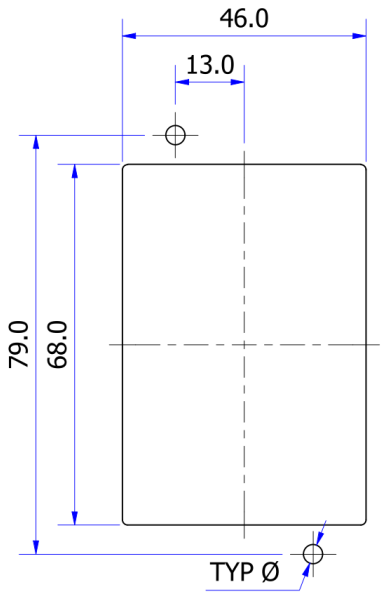


TABLE 1 - HOLE DIA	
PANEL THICKNESS (T)	HOLE DIA (Ø)
1mm < T < 2mm	3.6mm
T > 2mm	3.7mm

Panel cut-out to flush mount relay for use with rear connect TBD-R1 base

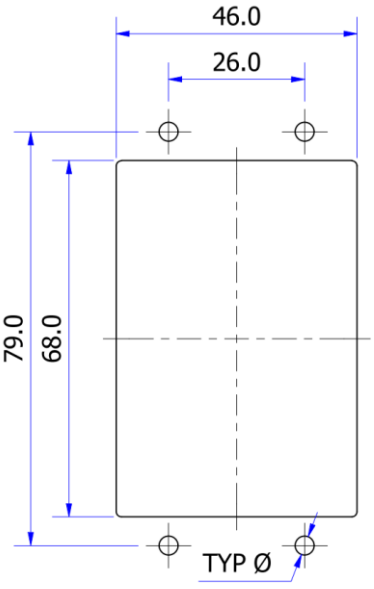


TABLE 1 - HOLE DIA	
PANEL THICKNESS (T)	HOLE DIA (Ø)
1mm < T < 2mm	3.6mm
T > 2mm	3.7mm

Panel cut-out to flush mount relay for use with rear connect TBD-R2 base

Delta ARD4 Relay Order Code

ARD4 -				
Contact Function	1		Self-reset contacts	
	4		Latching contacts with hand and electrical reset	
Nominal Operate Voltage		A	24 V dc	
		B	32 V dc	
		C	48 V dc	
		D	110 V dc	
		E	125 V dc	
		F	220 V dc	
		G	240 V dc	
		H	250 V dc	
Mounting Configuration			A — Surface or rail mounting without terminal block	# — Refer note 1
			A-F — Surface or rail mounting including TBD-F terminal block	
			A-R1 — Surface mount including TBD-R1 terminal block	
			B — Panel mounting without terminal block	
			B-R1 — Panel mounting including TBD-R1 terminal block	
			B-R2 — Panel mounting including TBD-R2 terminal block	

NOTE 1 The Delta relay will be supplied for mounting as per the order code selection above. However, the relay mounting can be changed by the customer from DIN rail mount (Code A) to Panel Mount (Code B) or vice versa using the TBD-AC Relay Mount Conversion Kit. This provides more flexibility for the customer to manage changes at site without returning to the factory for modification. The front panel relay ID employs a # code in place of the mounting configuration code to indicate that either mounting configuration is possible. For example, ARD4-4D#
The mounting configuration code **A** or **B** is shown on the escutcheon moulding.

Delta Terminal Block Order Codes

TBD -		
Terminal Block Connection	F	Front connect
	R1	Rear connect
	R2	Rear connect using terminal block retention plates

Delta Accessories

Relay mount components	TBD-AC	Relay mount conversion kit (Excludes terminal block)
Panel mount frames	TBD-AD	Dual - 4U x 2U frame to rack mount 2 high x 1 wide Delta relays
	TBD-AQ	Quad - 4U x 4U frame to rack mount 2 high x 2 wide Delta relays

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Relay Monitoring Systems Pty Ltd design, manufacture and market a wide range of electrical protection and control products for application on high voltage power systems. The company's depth of manufacturing and engineering expertise is backed up by many years of experience since the formation of its predecessor, Relays Pty Ltd (RPL), in 1955. This experience combined with a broad base of field proven product types enables RMS to service specific customer needs by producing relays on demand and with typically short lead times.

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ISO9001 Quality Accreditation

RMS holds BSI (British Standards Institution) registration number FS 604860 for the certification of a quality system to AS/NZS ISO9001:2008.