

Features

- Gold plated contacts for low resistance & reliable operation
- Rugged construction
- Sealed switch body
- One or two switch “gangs”
- Up to 22 tap switch positions
- Plug in screw terminal blocks
- Custom mechanical couplings
- Custom mounting brackets
- Optional resistor box for TPI transducer interface

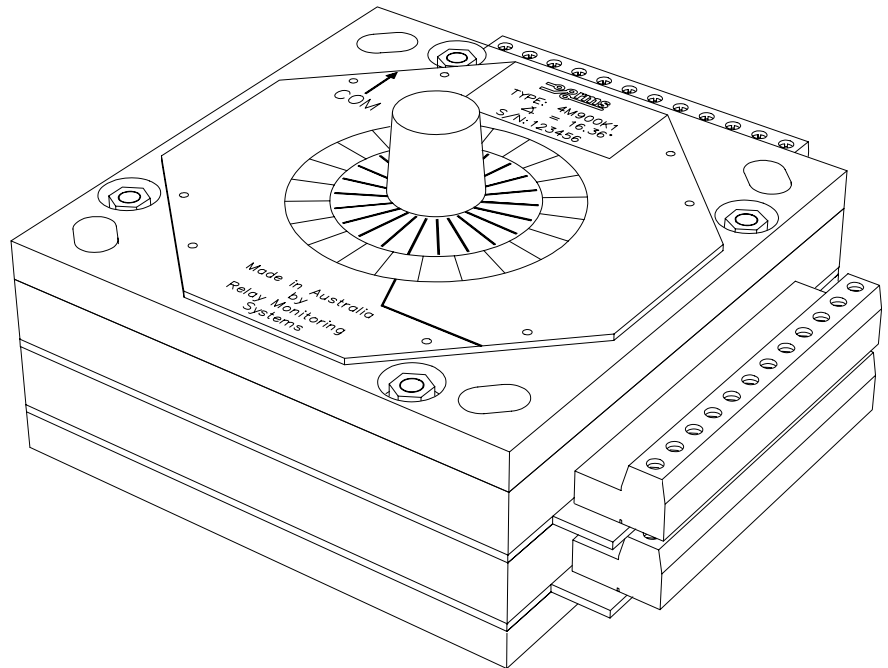
Application

The Tap Position Indicator (TPI) switches found on old power transformers present a number of ongoing maintenance & reliability problems due to:

1. Open frame design leave the contacts susceptible to contamination & degradation;
2. Age of the equipment has resulted in mechanical wear (backlash) in the mechanism;
3. The introduction of voltage transducers to interface the TPI to SCADA generally provide inadequate voltage & current levels to achieve reliable contact wetting;
4. The age of the equipment makes maintenance a hit & miss affair with problems occurring & disappearing for no apparent reason.

These issues lead to reliability problems by way of out of step alarms, loss of remote tap position indication etc.

The 4M900 TPI Selector Switch provides a complete replacement system, which rectifies the root cause of these problems.



4M900 with two switch gangs

Description

Made in Australia

The 4M900 Tap Position Indicator (TPI) switch, found on many old power transformer on load tap changers, require a high wetting current to provide reliable operation. Even at high current levels the TPI switch may go open circuit due to degraded contact surfaces causing loss of control and out of step alarms. This problem is made even worse when a modern TPI transducer is fitted due to limitations in the voltage levels employed & low wetting currents.

RMS has developed a custom rotary switch mechanism to replace old TPI switches. Gold plated low contact resistance switches are sealed in a specially machined case with connection via plug in Phoenix screw terminals. One or two rows of contacts are provided for separate out of step and tap position indication functions. A different circuit board is designed for each tap changer based on the number of taps, which determines the angle between tap positions. Mounting brackets and drive shaft adaptors to suit specific tap changers completes the upgrade kit.

TPI SWITCHES

The individual TPI switches are mounted in a radial pattern on a printed circuit board (PCB). Each PCB is design provide a specific number of tap positions to suit the tap changer in question.

TPI SWITCH GANGS

Typically two gangs of switches are required:

- ◆ One for the tap position indicator
- ◆ One for the out of step logic for parallel control schemes

The second switch gang is a duplicate of the first & is a separate isolated circuit.

WIRING TERMINATION

Plug in Phoenix screw terminals are provided at the edges of the PCB on two sides for each switch gang. One side of each N/O switch is internally wired to a common terminal. The other side of each N/O switch is wired to an individual terminal point.

HOUSING CONSTRUCTION

The 4M900 housing is machined from solid Acetal for strength & durability. The PCB's & switches are completely sealed. The drive shaft protrudes from the base of the assembly while a tap position pointer is provided at the top with provision for tap numbers to be recorded by the user.

TPI TRANSDUCER INTERFACE

Interface of the 4M900 to a TPI transducer is achieved using a resistor divider. Refer to RMS Technical Bulletin 4O200.

TPI CONTACTS

Select TPI switch version with up to a maximum of 22 N/O contacts.

AMBIENT OPERATING TEMPERATURE RANGE

-10 to 85 degrees C.

INSULATION WITHSTAND

IEC60255-5 2KV RMS & 1.2/50 5KV impulse between:

- ◆ each switch gang
- ◆ all terminals & mounting points

MOUNTING

The 4M900 is mounted using holes located at each corner of the device. These holes are extended such that a certain amount of adjustment is available to align the drive shaft to a switch center before final tightening.

A mounting bracket is typically required to mechanically interface the 4M900 within the tap change chamber. RMS can assist with the design & construction of a suitable mounting bracket for your tap changer.

MECHANICAL COUPLING

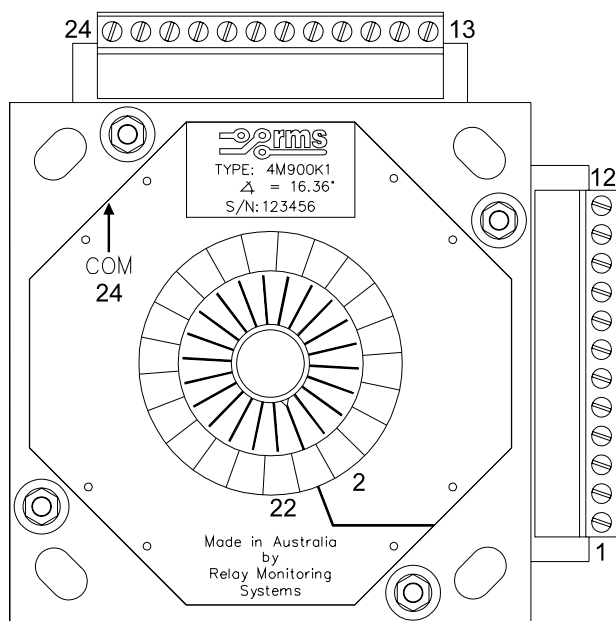
To connect the tap changer drive shaft to the 4M900 drive shaft requires a mechanical coupling of some sort. This coupling typically comprises a hollow shaft to fit over the existing tap change shaft & is secured using a compression clamp. The other end of the coupling employs an 'Oldham' type design (Depicted below) which engages with the 4M900.

The 'Oldham' coupling avoids the necessity for exact shaft alignment, provides zero backlash & incorporates a sacrificial nylon disc which can simply be replaced if worn.

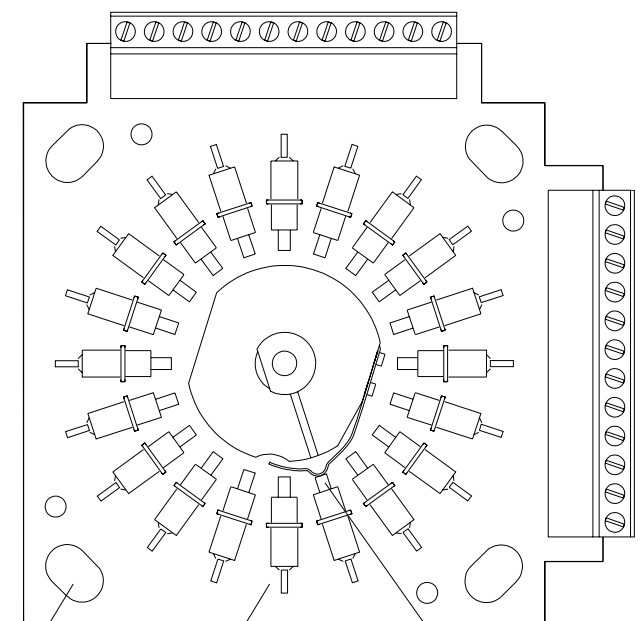
RMS can assist with the design & construction of a suitable mechanical coupling for your tap changer.



Top view showing tap positions



Internal switch layout

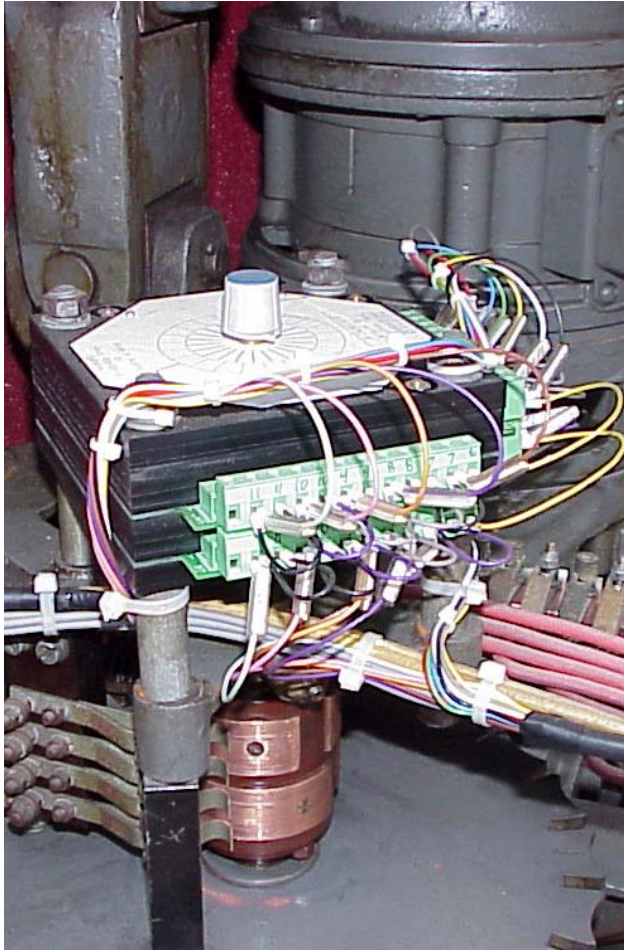


Mounting points

20 x TPI switches
(22 Maximum)

Actuating cam

TYPICAL INSTALLATION (Mechanical coupling below)



Ordering Information

Generate the required ordering code as follows: e.g. 4M900 B18

4M900

1

2

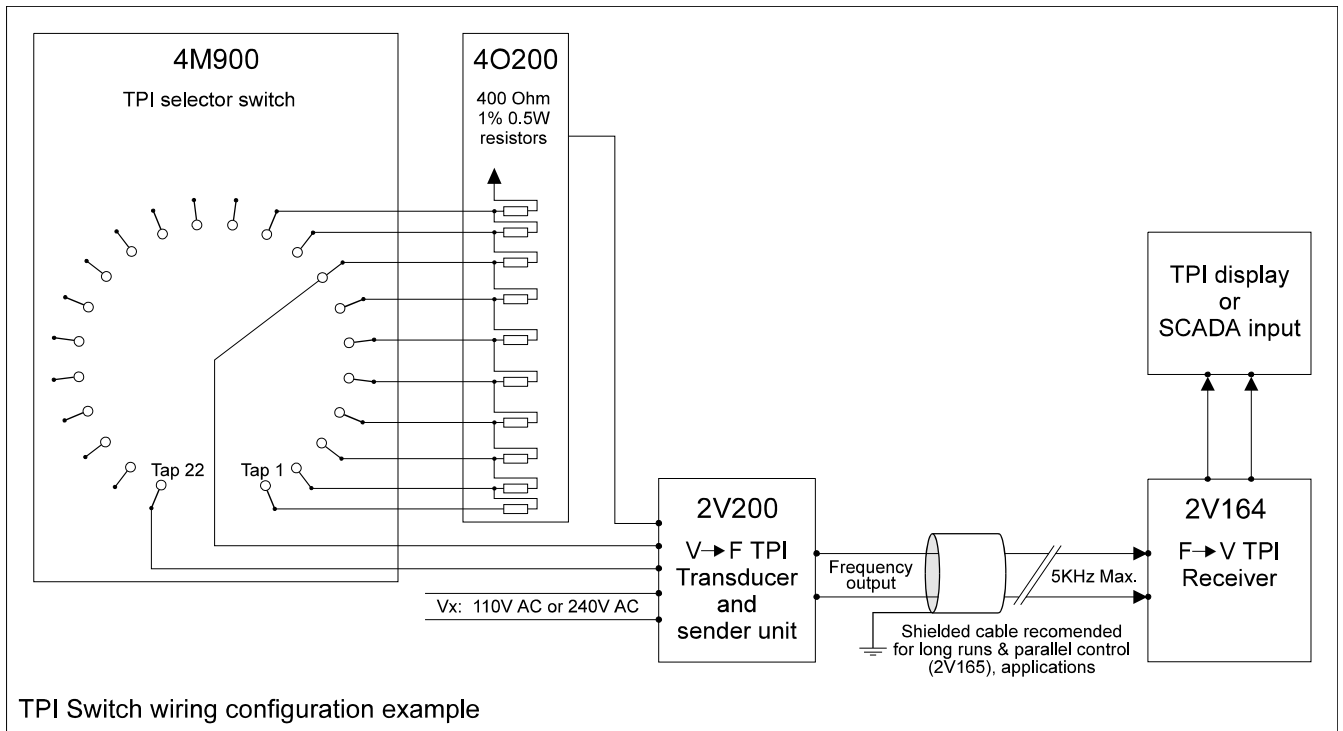
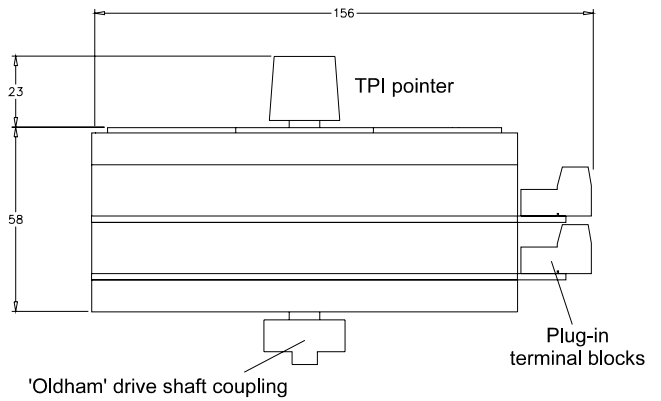
1 NUMBER OF SWITCH GANGS

- A One
- B Two

2 NUMBER OF TAPS PER GANG

xx (22 maximum)

TYPICAL DIMENSIONS



TPI Switch wiring configuration example

Australian Content

Unless otherwise stated the product(s) quoted are manufactured by RMS at our production facility in Melbourne Australia. Approximately 60% of our sales volume is derived from equipment manufactured in house with a local content close to 90%. Imported components such as semi-conductors are sourced from local suppliers & preference is given for reasonable stock holding to support our build requirements.

Quality Assurance

RMS holds NCSI (NATA Certification Services International), registration number 6869 for the certification of a quality assurance system to AS/NZS ISO9001-2000. Quality plans for all products involve 100% inspection and testing carried out before despatch. Further details on specific test plans, quality policy & procedures may be found in section A4 of the RMS product catalogue.

Product Packaging

Protection relays are supplied in secure individual packing cardboard boxes with moulded styrene inserts suitable for recycling. Each product & packing box is labeled with the product part number, customer name & order details.

Design References

The products & components produced by RMS are based on many years of field experience since Relays Pty Ltd was formed in 1955. A large population of equipment is in service throughout Australia, New Zealand, South Africa & South East Asia attesting to this fact. Specific product & customer reference sites may be provided on application.

Product Warranty

All utility grade protection & auxiliary relay products, unless otherwise stated, are warranted for a period of 24 months from shipment for materials & labour on a return to factory basis. Repair of products damaged through poor application or circumstances outside the product ratings will be carried out at the customer's expense.

Standard Conditions of Sale

Unless otherwise agreed RMS Standard Terms & Conditions (QF 907) shall apply to all sales. These are available on request or from our web site.



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