

Transducers and Adapters

for Vanguard circuit breaker analyzers



Vanguard Instruments
A DOBLE COMPANY



Transducers

Linear Digital Transducers



Vanguard Digital Linear transducers are designed to precisely measure circuit breaker contact linear motion. Using an optical encoder, the linear transducer can measure distances up to 25" with a 0.01" resolution. Our robust design measures velocity up to 41ft/sec (12.5m/sec).

Neither calibration nor setup is required when this transducer is used with a compatible Vanguard Time Travel Analyzer (DigitMR/CT-7000/CT-8000 CB analyzer family)






Vanguard linear travel transducers are available in 10" (P/N 9087-UC) and 25" (P/N 9088-UC) travel lengths. 30" travel or different lengths of travel are also available up on request.

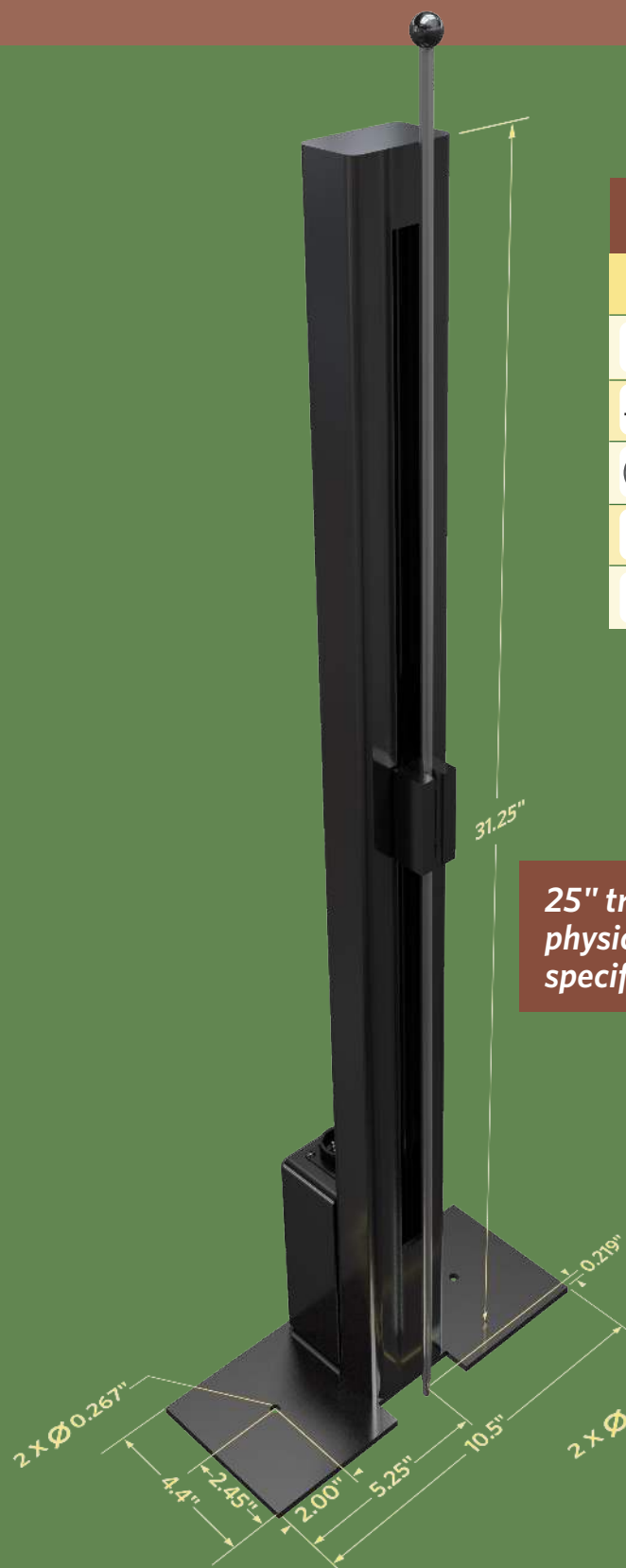


25" transducer on Siemens SPS2 Breaker

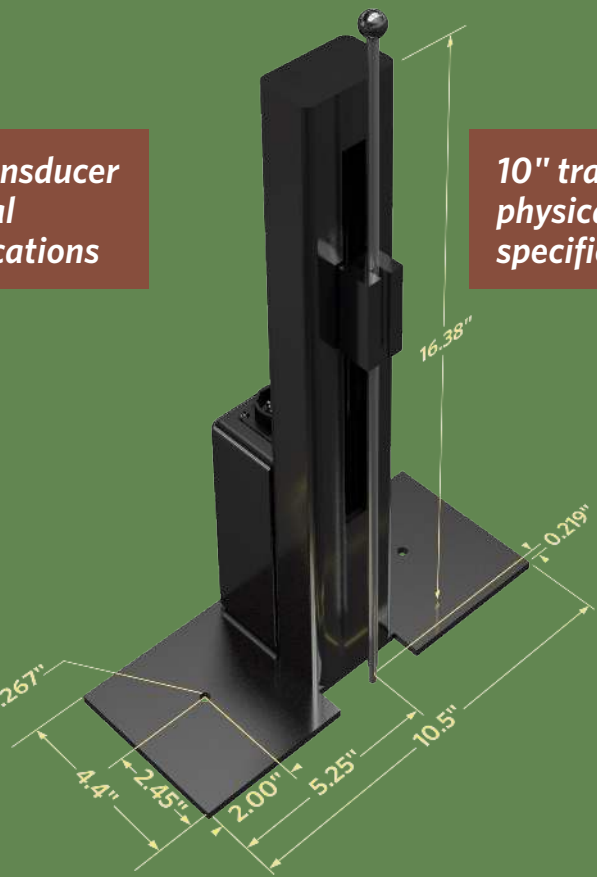
Breaker Timer Accessories *Transducers*

Linear Digital Transducers

<i>technical specifications</i>		
	10" linear transducer (part no 9087-UC)	25" linear transducer (part no 9088-UC)
 physical specs	17" (43.2 cm) L with 10.5" (26.7 cm) x 4.5" (11.4 cm) mounting base	31.5" (80 cm) L with 10.5" (26.7 cm) x 4.5" (11.4 cm) mounting base
 physical travel	0 - 10 inches max (0 - 25.4 cm max)	0 - 25 inches max (0 - 63.5 cm max)
 accuracy	0.1% of reading $\pm 0.1"$ (2.54 mm)	0.1% of reading $\pm 0.1"$ (2.54 mm)
 resolution	$\pm 0.01"$ (± 0.25 mm)	$\pm 0.01"$ (± 0.25 mm)
 velocity	41 ft/sec (12.5 m/sec)	41 ft/sec (12.5 m/sec)



25" transducer physical specifications

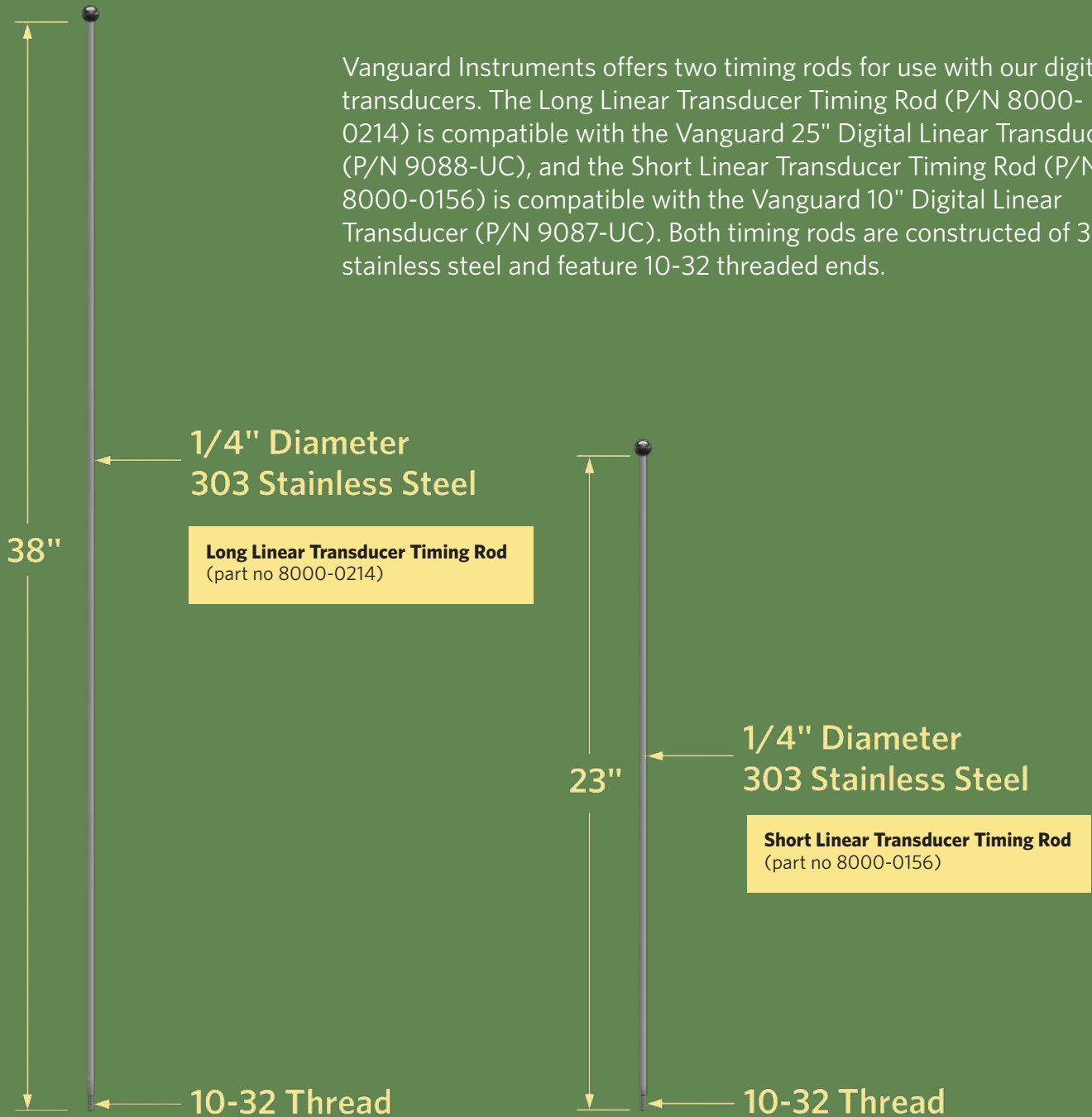


10" transducer physical specifications

Transducers

Linear Transducer Timing Rods

Vanguard Instruments offers two timing rods for use with our digital transducers. The Long Linear Transducer Timing Rod (P/N 8000-0214) is compatible with the Vanguard 25" Digital Linear Transducer (P/N 9088-UC), and the Short Linear Transducer Timing Rod (P/N 8000-0156) is compatible with the Vanguard 10" Digital Linear Transducer (P/N 9087-UC). Both timing rods are constructed of 303 stainless steel and feature 10-32 threaded ends.



Transducers

Linear Transducer Timing Rods

The ABB 72PM Timing Rod with Flexible Coupling (P/N 8000-0215) can be connected to a Vanguard Digital Linear Transducer and is used for timing an ABB 72PM circuit breaker.

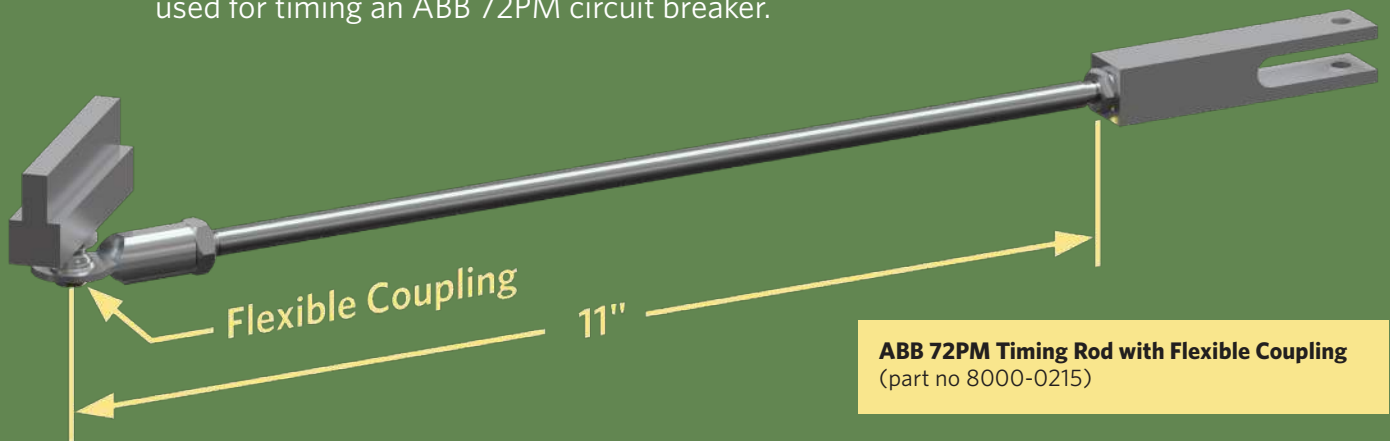


ABB 72PM Timing Rod Connected to Vanguard Linear Transducer

Transducers

Rotary Digital Transducers



Rotary transducers translate the rotary motion of a circuit breaker's linkage shaft to the linear motion of the circuit breaker's main contact. Vanguard rotary transducers employ optical encoders that can detect rotary position with a maximum velocity of 100 revolutions per second. Vanguard offers three rotary transducers, each of which is furnished with a drill chuck adapter and two adapter shafts with 8mm and 10mm threading, respectively. The included accessories can be used to connect the transducers to a wide range of circuit breakers in the field.



Type 3 rotary transducer on a Federal Pacific breaker

Breaker Timer Accessories *Transducers*

Type 1 Rotary Digital Transducer

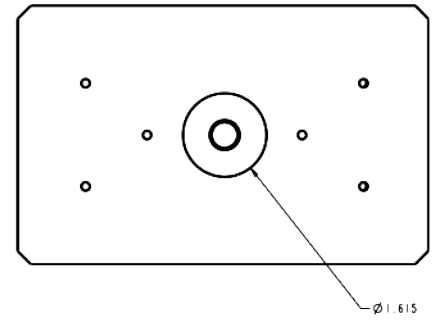
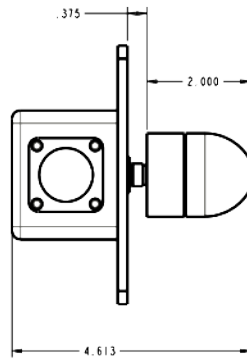


type 1 rotary digital transducer physical specifications

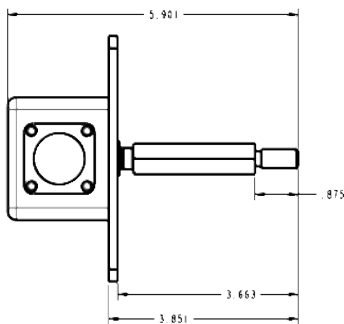
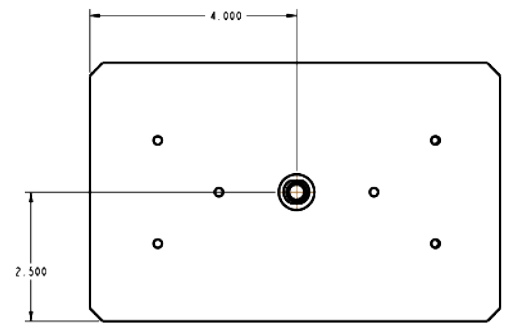
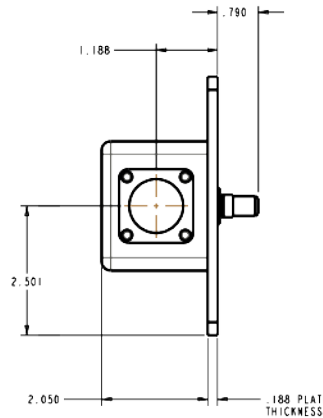
technical specifications

type 1 rotary digital transducer
(part no 9125-UC)

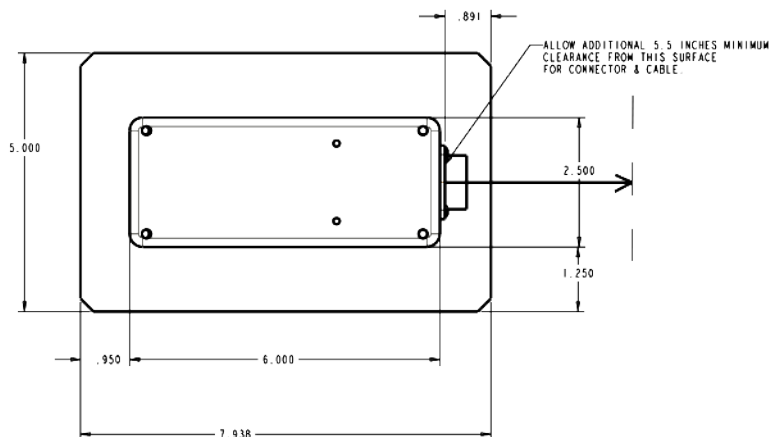
	physical travel	0 - 1,800 degrees
	accuracy	0.1% of reading ±0.36 degree
	resolution	±0.36 degree
	velocity	100 rev/sec max



VIEWS ABOVE SHOWN WITH TYPICAL DRILL CHUCK



VIEW ABOVE SHOWN WITH ADAPTER



Breaker Timer Accessories *Transducers*

Type 2 Rotary Digital Transducer

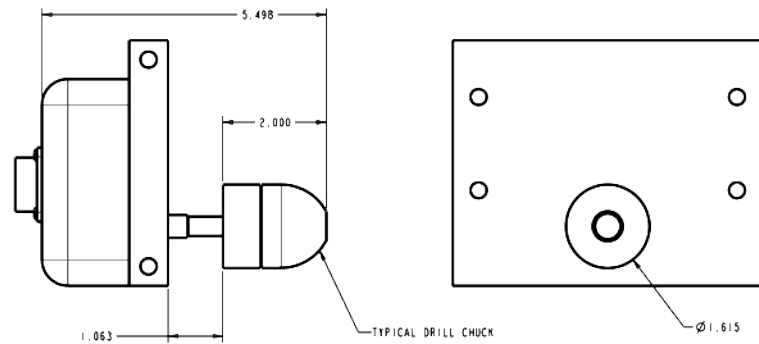


type 2 rotary digital transducer physical specifications

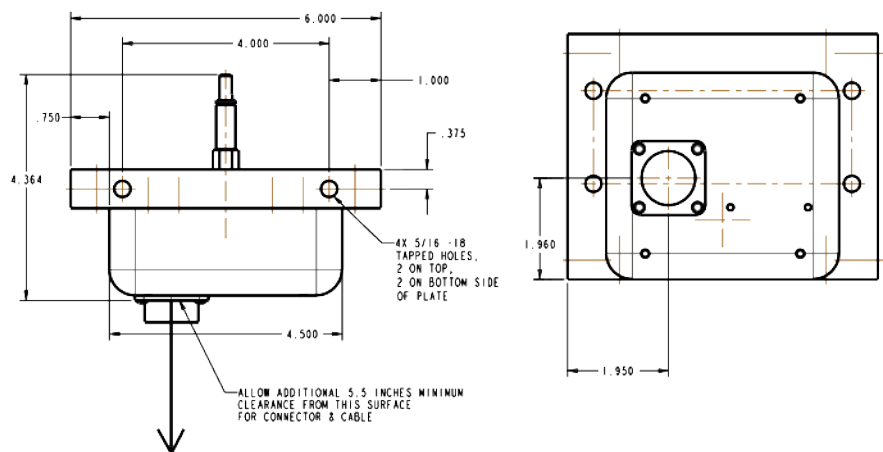
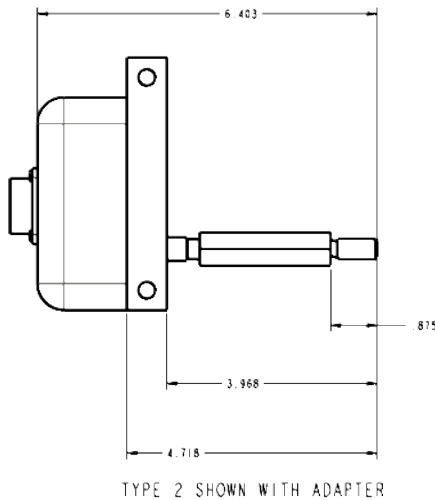
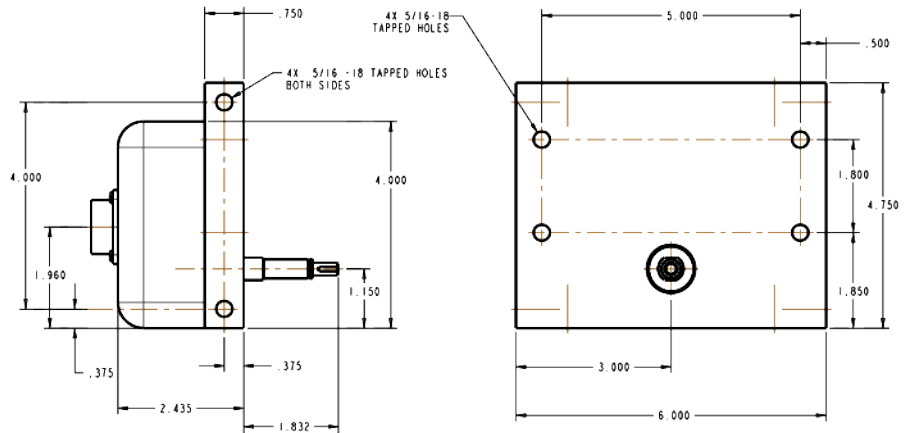
technical specifications

type 2 rotary digital transducer (part no 9090-UC)

	physical travel	0 - 1,800 degrees
	accuracy	0.1% of reading ±0.36 degree
	resolution	±0.36 degree
	velocity	100 rev/sec max



VIEWS ABOVE SHOWN WITH TYPICAL DRILL CHUCK

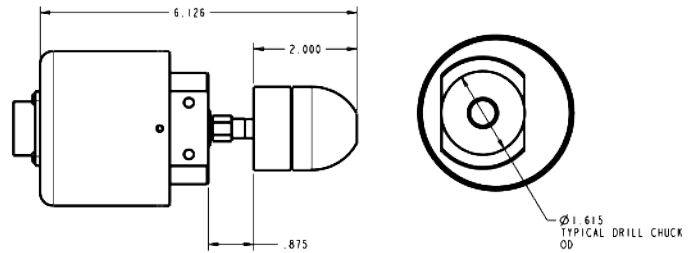


Breaker Timer Accessories *Transducers*

Type 3 Rotary Digital Transducer



type 3 rotary digital transducer physical specifications

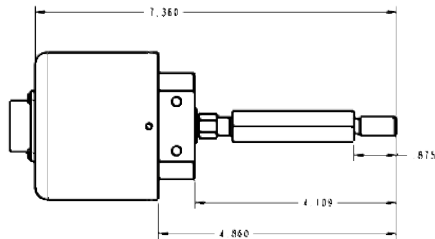
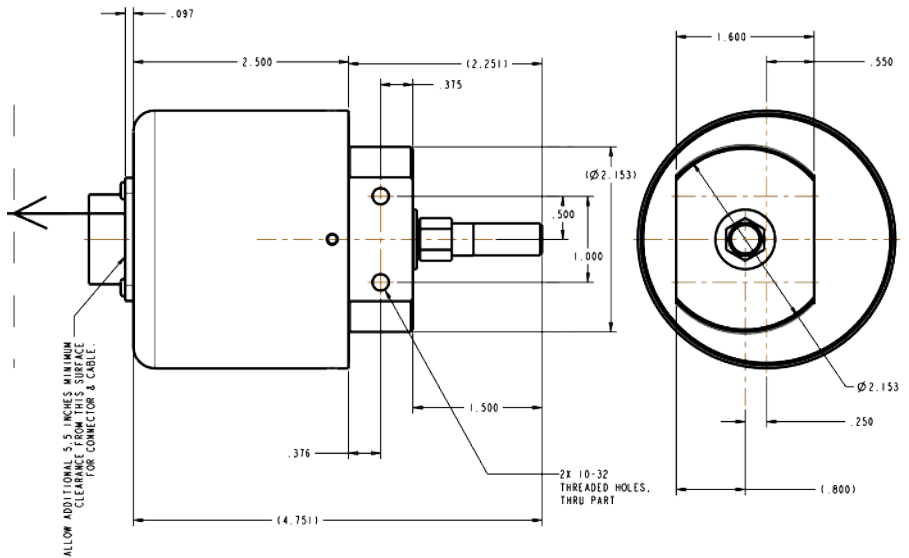


VIEWS ABOVE SHOWN WITH TYPICAL DRILL CHUCK

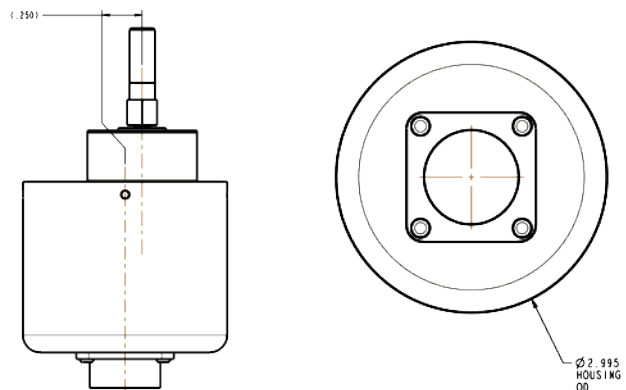
technical specifications

type 3 rotary digital transducer
with magnetic mount
(part no 9091-UC)

	physical travel	0 - 1,800 degrees
	accuracy	0.1% of reading ± 0.36 degree
	resolution	± 0.36 degree
	velocity	100 rev/sec max



VIEW ABOVE SHOWN WITH ADAPTER



Breaker Timer Accessories **Transducers**

Linear Resistor Transducer

technical specifications

linear resistor transducer (part no 9093-UC)

physical specs

physical travel 0 - 2 inches
(0 - 5 cm)

resistance range 0 - 5K Ω

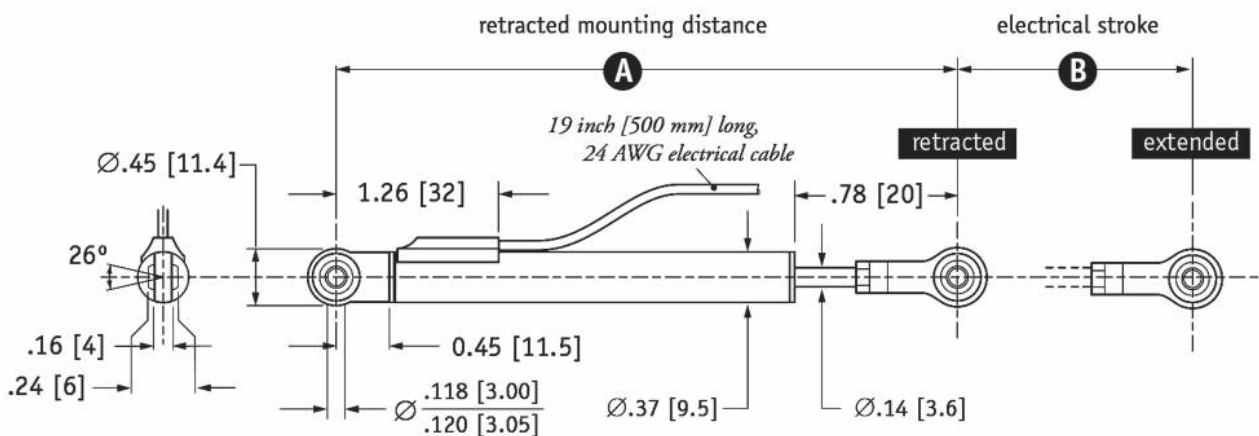
accuracy 0.1% of reading $\pm 0.1''$
(2.54 mm)

resolution $\pm 0.01''$ (± 0.25 mm)

velocity 25 ft/sec (7.6 m/sec)



The linear resistor transducer (part no **9093-UC**) is designed for measuring small displacements. A typical application for this transducer is to measure circuit breaker vacuum bottle displacement (0.25" - 0.50"). This resistor transducer can interface directly to the Vanguard CT-7000 S3 and CT-8000 S3 via the resistor transducer input channels.



Measurement Range	0.5 12.5	1 25	2 50	3 75	4 100	5 125	6 150	in mm
A	3.3 82.5	3.7 95	4.7 120	5.7 145	7.0 178	8.0 203	9.0 228	± 0.08 in adjustment ± 2 mm adjustment
B	0.49 12.5	0.98 25.0	1.97 50.0	2.95 75.0	3.94 100.0	4.92 125.0	5.91 150.0	in mm

All Dimensions are in INCHES [MM] • Tolerances are 0.03 in. [0.5 mm] unless otherwise noted

Breaker Timer Accessories *Transducers*

Transducer Adapters



RESISTOR TRANSDUCER ADAPTER

part no **9095-UC**

The Vanguard Resistor Transducer Adapter (RTA) can be used to connect any resistor type transducer to the digital transducer channel of a Vanguard circuit breaker analyzer. The RTA also features a 3-pin SwitchCraft connector that can directly interface with ABB resistor transducers.



Connected to an ABB AHMB resistor-type transducer



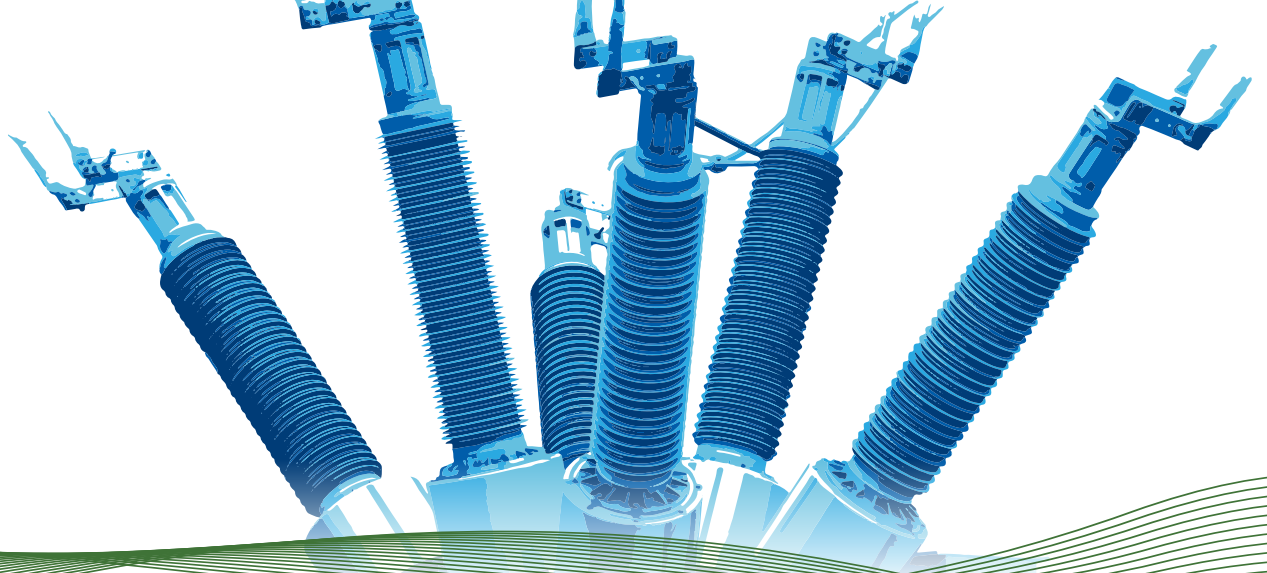
DOBLE TRANSDUCER ADAPTER

part no **9084-UC**

The Doble Transducer Adapter can be used to interface any Doble travel transducer to a Vanguard circuit breaker analyzer.



Connected to a Doble rotary transducer



Instruments designed and developed by the hearts and minds of utility electricians around the world.

Founded in 1991 and located in Ontario, California, USA, Vanguard Instruments™ offers a wide range of diagnostic test equipment that accurately and efficiently measures the health of critical substation equipment, such as transformers, circuit breakers, and protective relays.

Our first product was a computerized, extra high voltage (EHV) circuit breaker analyzer, which became the forerunner of an entire line of EHV circuit breaker test equipment. Over the years, our portfolio has grown tremendously to include microcomputer-based precision micro-ohmmeters; single- and three-phase transformer winding turns-ratio testers; transformer winding-resistance meters; mega-ohm resistance meters; and a variety of other application-specific products.

Our instruments are rugged, reliable, accurate, and user friendly. They eliminate tedious and time-consuming operations, while providing fast, complex test-result calculations. Using our equipment helps reduce errors and eliminates the need to memorize long sequences of procedural steps.

In 2017, Vanguard Instruments became a part of Doble Engineering Company, an energy industry leader in hardware, software, and services that diagnose and monitor the health of critical assets.



Vanguard Instruments

A DOBLE COMPANY

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