



TEST EQUIPMENT RENTAL SERVICES

When you rent Test Equipment from TDC, we want you to know that you will have a dedicated personal service from start to finish. Our Customer Service team is here to support you throughout your rental period.

TDC are independent specialists promoting all high quality manufacturers and instrument types. Equipment can be delivered Next Day or Same Day to suit your requirements.

When you are finished, simply contact us to arrange your equipment collection or alternatively you can despatch it back to us – we make it easy.

RENTING FROM TDC JUST MAKES SENSE

By using TDC Test Equipment Rental Solutions, you benefit from our extensive rental inventory that is second to none. We constantly refresh our equipment range with branded equipment manufacturers such as Megger, FLUKE, Chauvin Arnoux, OMICRON, FLIR, b2 HVA, Agilent Technologies, Dranetz BMI, Fujikura, JDSU, Ametek Jofra, GE DRUCK, RAE Systems, TSI Airflow, Rohde & Schwarz, NORBAR, PANAMETRICS, Tektronix and many more.

You can utilise our rental equipment to suit your own requirements, from one week to as many months as you need. You only pay for what you use down to the day. Renting with TDC is straightforward and easy. Our expert Sales and Applications Engineers will find the best solution to suit your application.

Delivery & Collection is arranged by us - we make it hassle free and easy.

TDC 6 POINT RENTAL GUARANTEE - OUR REPUTATION MATTERS



1 SAME DAY DISPATCH

Many of our customers operate to very strict deadlines. Providing the order is placed and confirmed before 3pm, your equipment will be despatched the same day.



2 QUALITY

All Equipment is checked prior to dispatch to ensure it is servicable and in safe working order. Certification checks are standard.



3 SUPPORT

We will provide you with enough information to make an informed choice of the correct equipment required for your application.



4 PRICE

We offer a simple price match promise. We'll match any genuine competitor quote.



5 CUSTOMER SERVICE

We can promise that throughout your rental period, we will do our utmost to provide you with the best customer service. All information we provide is in good faith and free of charge. We will provide a quote for any consultancy or professional advice that may be required.



6 REPUTATION

We know we are only as good as our last job. We don't just want regular customers - we want to build loyal customers.



For all enquiries, please contact: Gordon Thow (Test Equipment Rental Manager)

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Megger[®]



TEST EQUIPMENT RENTAL SERVICES

ODEN AT Primary Current Injection Test

Datasheet



ODEN AT™

Primary Current Injection Test System

This powerful test system is designed for primary injection testing of protective relay equipment and circuit breakers. It is also used to test the transformation ratio of current transformers and for other applications that require high variable currents.

The system consists of a control unit together with one, two or three current units. There are three versions of the current unit: S, X and H. The S and X current units are identical except that the X unit has an additional 30/60 V output. The H unit is rated for even higher current. This makes it possible to configure an ODEN AT™ system in a suitable way. All parts are portable, and ODEN AT™ can be quickly assembled and connected.

The control unit has many advanced features – a powerful measurement section for example, that can display transformation ratio as well as time, voltage and current. A second measurement channel can be used to test an additional current or voltage. Current transformer turns ratio, impedance, resistance, power, power factor ($\cos \varphi$) and phase angle are calculated and shown in the display. Current and voltage can be presented as percentages of nominal value. The fast-acting hold function freezes short-duration readings on the digital display when the voltage or contact signal arrives at the stop input, the object under test interrupts the current or injection is stopped.

APPLICATIONS

Primary current injection testing and breaker testing

These tests require high currents and the ability to measure very short current and time cycles. Oden AT has been designed especially to meet these needs. No extra contacts are needed to measure the operating time of a low-voltage breaker. Testing stops at the instant when the main breaker contacts open to interrupt the current. Output current initiation is synchronized with the currents zero-crossover point to ensure good repeatability and minimized DC offset.

Testing current transformers

For turns-ratio testing, the primary current and either the secondary current or the turns-ratio are displayed simultaneously. Since the turns-ratio is displayed directly as the nominal value (1000/5 for example), no further calculation is needed. Burden of secondary circuits can be measured and presented in VA.

Polarity testing

The currents phase displacement is shown, and the polarities of the outputs are clearly marked.

Heat runs

Oden AT is ideal for performing heat runs. Current can be applied continuously or through programmable intervals. The times can be shown in minutes and hours which facilitates long-term testing.

Automatic reclosers and sectionalizers

Oden AT can also be set to test direct-acting automatic reclosers and sectionalizers. Operating limits, partial times, total times and the number of operations before lockout can be measured. User-selectable reclosing sequences can be programmed for testing sectionalizers.

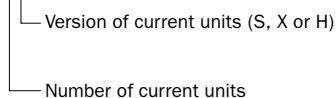
Testing integrity of ground grids and safety-ground devices

One way to test ground grids is by injecting current between a reference ground and the ground to be tested and measuring the voltage drop and the percentage of current flowing through the ground grid. The type X current unit included with Oden AT is designed for this type of application. Personal safety grounds must be tested at rated current, a task for which Oden AT is well suited.

SPECIFICATIONS

An Oden AT-system consists of a control unit and one, two or three current units. There are three different versions of the current units: S-unit (standard), X-unit (extra 30/60 V outlet) and H-unit (high current). The system designation indicates the number of current units included.

Example: Oden AT/2X



Outputs

ODEN AT 240 V mains voltage, 50-60 Hz				
	Open circuit voltage	Max continuous current ³⁾	Max current 3 minutes ³⁾	Max current 1 sec. ³⁾
ODEN AT/1S	6 V	1000 A	2000 A	7000 A
ODEN AT/2S	¹⁾ 6 V	1680 A	3600 A	8000 A
	²⁾ 12 V	1000 A	2000 A	4000 A
ODEN AT/3S	¹⁾ 6 V	2500 A	5200 A	8000 A
	²⁾ 18 V	840 A	1700 A	2600 A
ODEN AT/1X				
High current output	6 V	1000 A	2000 A	7000 A
Output 0-30/60 V				
30 V range	30 V	160 A	300 A	1200 A
60 V range	60 V	80 A	150 A	600 A
ODEN AT/2X				
High current output	¹⁾ 6 V	1680 A	3600 A	8000 A
	²⁾ 12 V	1000 A	2000 A	4000 A
Output 0-30/60 V				
30 V range	¹⁾ 30 V	320 A	600 A	1600 A
30 V range	²⁾ 60 V	160 A	300 A	800 A
60 V range	²⁾ 120 V	80 A	150 A	400 A
ODEN AT/3X				
High current output	¹⁾ 6 V	2500 A	5200 A	8000 A
	²⁾ 18 V	840 A	1700 A	2600 A
Output 0-30/60 V				
30 V range	¹⁾ 30 V	480 A	900 A	1600 A
30 V range	²⁾ 90 V	160 A	300 A	520 A
60 V range	²⁾ 180 V	80 A	150 A	260 A
ODEN AT/1H	3.6 V	1250 A	2600 A	11 kA
ODEN AT/2H	¹⁾ 3.6 V	2500 A	5500 A	13 kA
	²⁾ 7.2 V	1250 A	2800 A	6500 A
ODEN AT/3H	¹⁾ 3.6 V	3800 A	8000 A	13 kA
	²⁾ 10.7 V	1250 A	2900 A	4300 A

¹⁾ Current units connected in parallel.

²⁾ Current units connected in series.

³⁾ Maximum possible current is also limited by the impedance in the test circuit. The current value can not exceed output voltage (see diagrams)/impedance value.

Timer

Presentation: In seconds, cycles, minutes and hours.

Ranges: 0.000-99999.9 s, 99 h 59 min

Max. input voltage: 250 V AC or 275 V DC

Ammeters

Measurement method: AC, true RMS

Accuracy: 1% of range ±1 digit

Ranges, ammeter 1: 0-4800 A / 0-15kA, 0-9600 A / 0-30 kA or 0-960 A / 3000 A.

Ranges, ammeter 2: 0-2 A, 0-20 A

Voltmeter

Measurement method: AC, true RMS

Ranges: 0-0.2 V, 0-2 V, 0-20 V, 0-200 V, AUTO

Accuracy: 1% of range ±1 digit

Weights and dimensions

Control unit AT: 25 kg (55 lbs), 570 x 310 x 230 mm (22.4" x 12.2" x 9")

Current unit S: 42 kg (92.6 lbs), 570 x 310 x 155 mm (22.4" x 12.2" x 6")

Current unit X: 45 kg (99.3 lbs), 570 x 310 x 155 mm (22.4" x 12.2" x 6")

Current unit H: 49 kg (108 lbs), 570 x 310 x 155 mm (22.4" x 12.2" x 6")

Outputs

ODEN AT 400 V mains voltage, 50-60 Hz				
	Open circuit voltage	Max continuous current ³⁾	Max current 3 minutes ³⁾	Max current 1 sec. ³⁾
ODEN AT/1S	6 V	1000 A	2000 A	7000 A
ODEN AT/2S	1) ¹⁾ 6 V	1900 A	4000 A	13 kA
	2) ²⁾ 12 V	900 A	2000 A	6000 A
ODEN AT/3S	1) ¹⁾ 6 V	1900 A	4000 A	13 kA
	2) ²⁾ 18 V	600 A	1400 A	4400 A
ODEN AT/1X				
High current output	6 V	1000 A	2000 A	7000 A
Output 0-30/60 V				
30 V range	30 V	160 A	300 A	1200 A
60 V range	60 V	80 A	150 A	600 A
ODEN AT/2X				
High current output	1) ¹⁾ 6 V	1900 A	4000 A	13 kA
	2) ²⁾ 12 V	900 A	2000 A	6000 A
Output 0-30/60 V				
30 V range	1) ¹⁾ 30 V	320 A	600 A	2500 A
30 V range	2) ²⁾ 60 V	160 A	300 A	1200 A
60 V range	2) ²⁾ 120 V	80 A	150 A	600 A
ODEN AT/3X				
High current output	1) ¹⁾ 6 V	1900 A	4000 A	13 kA
	2) ²⁾ 18 V	600 A	1400 A	4400 A
Output 0-30/60 V				
30 V range	1) ¹⁾ 30 V	380 A	850 A	2600 A
30 V range	2) ²⁾ 90 V	120 A	290 A	880 A
60 V range	2) ²⁾ 180 V	60 A	145 A	440 A
ODEN AT/1H	3.6 V	1250 A	2600 A	11 kA
ODEN AT/2H	1) ¹⁾ 3.6 V	2500 A	5300 A	21 kA
	2) ²⁾ 7.2 V	1250 A	2500 A	10.9 kA
ODEN AT/3H	1) ¹⁾ 3.6 V	3800 A	7700 A	21.9 kA
	2) ²⁾ 10.7 V	1250 A	2600 A	7200 A

1) Current units connected in parallel.

2) Current units connected in series.

3) Maximum possible current is also limited by the impedance in the test circuit. The current value can not exceed output voltage (see diagrams)/impedance value.

Other

Application field: The instrument/system is intended for use in high-voltage substations and industrial environments.

Languages in menu: English, German, French, Spanish and Swedish.

Mains voltage: 240 V AC or 400 V AC $\pm 10\%$, 50-60 Hz.

Mains inlet: CEE 63 A connection.

Input current: Output current x open circuit voltage/input voltage.

Carriage for use out- and indoors: Always included with purchase of a complete system.

Operating temperature: -5 to +50°C (+23 to +122°F)

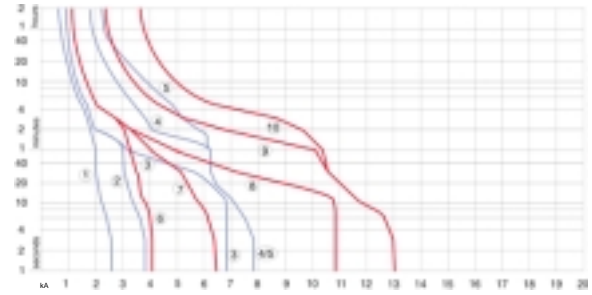
Storage temperature: -25 to +55°C (-13 to +127°F)

Warranty: 1 year

The above specifications are valid at nominal input voltage and an ambient temperature of +25°C (+77°F).

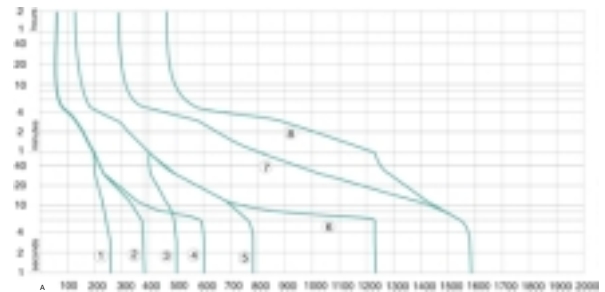
Specifications are subject to change without notice.

High current output, ODEN AT systems for 240 V



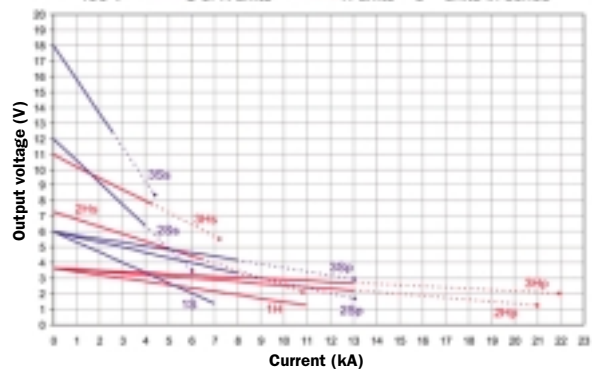
1. Oden AT/3S, units in series
 2. Oden AT/2S, units in series
 3. Oden AT/1S
 4. Oden AT/2S, units in parallel
 5. Oden AT/3S, units in parallel
 6. Oden AT/3H, units in series
 7. Oden AT/2H, units in series
 8. Oden AT/1H
 9. Oden AT/2H, units in parallel
 10. Oden AT/3H, units in parallel
- Note: The curves for systems with type S units are also valid for systems equipped with units of type X.

Output 0-30 V/60 V ODEN AT systems for 240 V



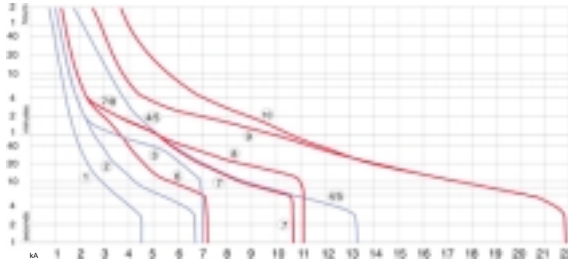
1. Oden AT/3X 60 V, units in series
2. Oden AT/2X 60 V, units in series
3. Oden AT/3X 30 V, units in series
4. Oden AT/1X 60 V
5. Oden AT/2X 30 V, units in series
6. Oden AT/1X 30 V
7. Oden AT/2X 30 V, units in parallel
8. Oden AT/3X 30 V, units in parallel

High current output, ODEN AT systems 240/400 V, 50 Hz



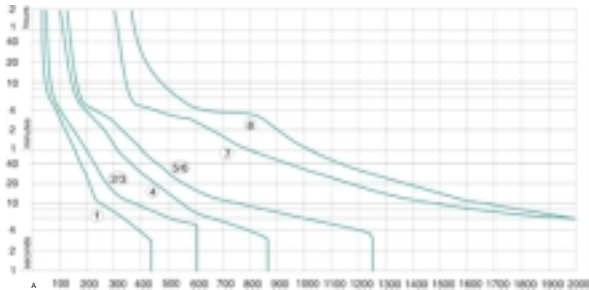
- 240 V — S or X units
 - 240 V — H units
 - 400 V S or X units
 - 400 V H units
- p = units in parallel, s = units in series

High current output, ODEN AT systems for 400 V



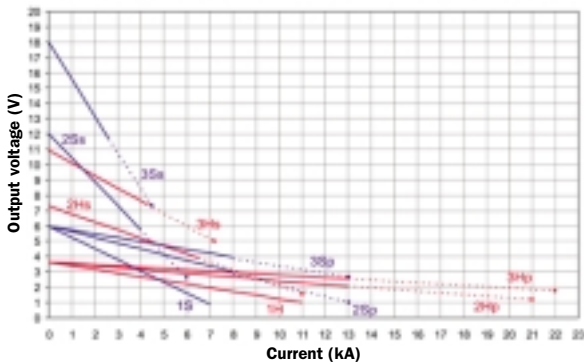
1. Oden AT/3S units in series
 2. Oden AT/2S units in series
 3. Oden AT/1S
 4. Oden AT/2S units in parallel
 5. Oden AT/3S units in parallel
 6. Oden AT/3H units in series
 7. Oden AT/2H units in series
 8. Oden AT/1H
 9. Oden AT/2H units in parallel
 10. Oden AT/3H units in parallel
- Note: The curves for systems with type S units are also valid for systems equipped with units of type X.

Output 0-30 V/60 V ODEN AT systems for 400 V



1. Oden AT/3X 60 V, units in series
2. Oden AT/2X 60 V, units in series
3. Oden AT/1X 60 V
4. Oden AT/3X 30 V, units in series
5. Oden AT/2X 30 V, units in series
6. Oden AT/1X 30 V
7. Oden AT/2X 30 V, units in parallel
8. Oden AT/3X 30 V, units in parallel

High current output, ODEN AT systems 240/400 V, 60 Hz



- 240 V — S or X units
 - 240 V — H units
 - 400 V — S or X units
 - 400 V — H units
- p = units in parallel, s = units i series

OPTIONAL ACCESSORIES

Multi-cable high current cable sets

Low-impedance multi-cable sets for higher output current. Available with 2, 3, 4 or 6 parallel cables, and in lengths of 0.5, 1.0, 1.5 or 2 meters.

Total area: 240 mm² (2x120)

Length:	Impedance ¹⁾ :	Art.No:
2 x 0.5 m (1.6 ft)	0.21 mΩ	GA-12205
2 x 1 m (3.3 ft)	0.32 mΩ	GA-12210
2 x 1.5 m (4.9 ft)	0.42 mΩ	GA-12215
2 x 2 m (6.6 ft)	0.53 mΩ	GA-12220

Total area: 360 mm² (3x120)

Length:	Impedance ¹⁾ :	Art.No:
2 x 0.5 m (1.6 ft)	0.18 mΩ	GA-12305
2 x 1 m (3.3 ft)	0.25 mΩ	GA-12310
2 x 1.5 m (4.9 ft)	0.32 mΩ	GA-12315
2 x 2 m (6.6 ft)	0.39 mΩ	GA-12320

Total area: 480 mm² (4x120)

Length:	Impedance ¹⁾ :	Art.No:
2 x 0.5 m (1.6 ft)	0.16 mΩ	GA-12405
2 x 1 m (3.3 ft)	0.21 mΩ	GA-12410
2 x 1.5 m (4.9 ft)	0.27 mΩ	GA-12415
2 x 2 m (6.6 ft)	0.32 mΩ	GA-12420

Total area: 720 mm² (6x120)

Length:	Impedance ¹⁾ :	Art.No:
2 x 0.5 m (1.6 ft)	0.14 mΩ	GA-12605
2 x 1 m (3.3 ft)	0.18 mΩ	GA-12610
2 x 1.5 m (4.9 ft)	0.21 mΩ	GA-12615
2 x 2 m (6.56 ft)	0.25 mΩ	GA-12620

¹⁾ Twisted-pair cables

Cable Set 5 m

2 x 5 m (16 ft)/120 mm²
Impedance: 2.2 mΩ
Weight: 15.2 kg (33.5 lbs)
Art.No: GA-12052

Cable set 5 m

To be used for the 30/60 V output of current unit X.
 2 x 5 m (16 ft)/25 mm²
Weight: 4 kg (8.8 lbs)
Art.No: GA-02052

Autotransformers

Permits an ODEN AT designed for 240 V mains voltage to operate on 400 V mains voltage.

Art.No: BH-45030

Permits an ODEN AT designed for 400 V mains voltage to operate on 240 V mains voltage.

Art.No: BH-45040

Permits an ODEN AT designed for 400 V mains voltage to operate on 450 V mains voltage.

Art.No: BH-45050

Permits an ODEN AT designed for 400 V mains voltage to operate on 500 V mains voltage.

Art.No: BH-45060

Permits an ODEN AT designed for 400 V mains voltage to operate on 480 V or 240 V mains voltage (user-changeable).

Art.No: BH-45070

Please contact GE Energy Services if you need to operate ODEN AT on other mains voltage.

ORDERING INFORMATION

A carriage (Art.No. 50-00092) is always included with purchase of a complete ODEN system. The cable set(s) for connection to the object under test must however be stated as a separate item in the order. Cable for connecting current units in series is included with purchase of a control unit.

ODEN AT Primary Current Injection Test Systems

ODEN AT/1S Control unit AT + 1 current unit S
Mains voltage: 240 V **Art.No:** BH-62411
 400 V BH-64011
 480 V ¹⁾60 Hz BH-64811

ODEN AT/2S Control unit AT + 2 current units S
Mains voltage: 240 V **Art.No:** BH-62412
 400 V BH-64012
 480 V ¹⁾60 Hz BH-64812

ODEN AT/3S Control unit AT + 3 current units S
Mains voltage: 240 V **Art.No:** BH-62413
 400 V BH-64013
 480 V ¹⁾60 Hz BH-64813

ODEN AT/1X Control unit AT + 1 current unit X
Mains voltage: 240 V **Art.No:** BH-62421
 400 V BH-64021
 480 V ¹⁾60 Hz BH-64821

ODEN AT/2X Control unit AT + 2 current units X
Mains voltage: 240 V **Art.No:** BH-62422
 400 V BH-64022
 480 V ¹⁾60 Hz BH-64822

ODEN AT/3X Control unit AT + 3 current units X
Mains voltage: 240 V **Art.No:** BH-62423
 400 V BH-64023
 480 V ¹⁾60 Hz BH-64823

ODEN AT/1H Control unit AT + 1 current unit H
Mains voltage: 240 V **Art.No:** BH-62431
 400 V BH-64031
 480 V ¹⁾60 Hz BH-64831

ODEN AT/2H Control unit AT + 2 current units H
Mains voltage: 240 V **Art.No:** BH-62432
 400 V BH-64032
 480 V ¹⁾60 Hz BH-64832

ODEN AT/3H Control unit AT + 3 current units H
Mains voltage: 240 V **Art.No:** BH-62433
 400 V BH-64033
 480 V ¹⁾60 Hz BH-64833

¹⁾ Same load-time rating as systems for 400 V.



Cable application



Multi-cable high current, cable set 6x120 mm²

- 1 Miniature circuit breaker used for current output**
Interrupts output current. Can also be actuated manually for safe disconnection of load.
- 2 Display**
The display presents time, output current, voltage, current shown on ammeter 2 and phase angle. You can scroll through entities Z, P, Q, R, X, S, power factor (cos ϕ) and I max.
- 3 Hold function**
This function freezes readings on the display.
- 4 Setting buttons**
Personnel unfamiliar with Oden AT can use the pre-defined settings very effectively, while experienced users can make their own basic settings. **AMMETER.** Used to set the main current-output ammeter. You can select the desired range or select autoranging. **V/A METER.** Toggles between the voltmeter and ammeter 2. Also used to select the desired range or select autoranging. **SYSTEM.** Used for general settings. **MEMORY.** Used to save or recall settings to or from the ten Oden AT memories. One of these memories contains the default (pre-defined) settings that are invoked when Oden AT is powered up. **APPLICATION.** Used to invoke the desired measurement mode:
a) automatic recloser, b) sectionalizer or c) microhmmer. Oden AT can also be set to generate pulse trains with user-selectable pulse and pause times.
- 5 Selection/setting (CHANGE) knob**
Selects the desired menu option (shown in the display window). Also used to change numerical values.
- 6 Knob for fine adjustment of current and +/- buttons for coarse adjustment.**
- 7 Current reduction button**
Used during setting to reduce the output current to 1/30. Useful in order to avoid for example unintentional tripping and overheating.
- 8 Injection**
Starts current injection and timing.
- 9 Momentary Injection**
When this button is used, injection continues only as long as it is pressed. Useful in order to avoid for example overheating.
- 10 RS232 for computer**
Oden AT is equipped with a serial port for communication with personal computers (for transfer of test data for example).
- 11 Manual shutoff**
Injection and timing are stopped when this button is pressed.
- 12 Automatic injection stop**
Generation stops after a user-specified interval or when condition at the input is met. The diodes show the selected OFF condition.
- 13 Input for voltmeter**
Used to measure voltage and also for microhmmer measurement.
- 14 Indicator lamps**
Indicate whether ammeter 2 or the voltmeter is enabled.
- 15 Input for ammeter 2**
Used to measure current in an external circuit (in a current transformer's secondary winding for example).
- 16 Stop-condition indicator**
Indicates that a contact connected to the input is closed or if voltage is present.
- 17 Status indicator**
Indicates if a contact connected to the input is closed or if voltage is present.
- 18 Stop input**
Used to freeze a reading or stop injection. Activated when current is interrupted by the object being tested, when an external contact is actuated or when a voltage is applied or removed.



To combine outstanding versatility with user-friendliness, ODEN AT's designers gave the front panel and user interface top priority. The clearly marked control panel is divided into sections. There are a number of pre-defined settings for frequently encountered applications. You can repeat any test by pressing a single button.



AC/DC Motors & Generators



Electrical Engineering



Mechanical Engineering



Condition Monitoring



Precision Machining



Marine Electronics



Elec & Mech Product Supply



Calibration and Rental Services



Quality Coatings



Transformers



Control Panels



Compressors



Auxiliary Power Systems

To differentiate our organisation in order to achieve continuous, sustainable growth, TDC endeavours to fully understand and exceed the expectations of our customers, and to work proactively to deliver **Engineering Excellence**.



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