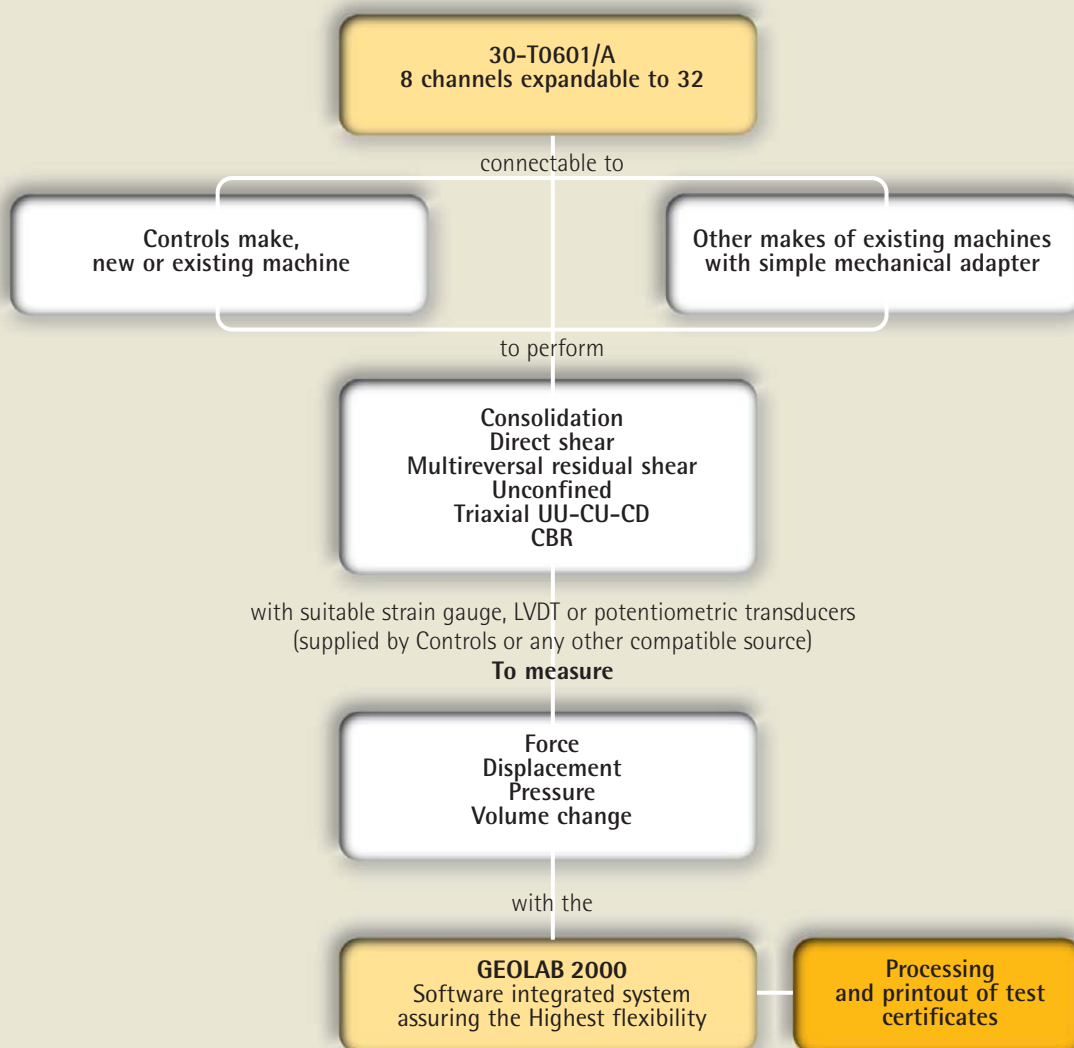## AUTOMATIC DATA ACQUISITION AND PROCESSING SYSTEM

30-T0601/A

- 8 channels capacity expandable to 32
- Recording and monitoring in real time of test data
- Easy calculation of test parameters
- Independent access to recorded data from the different type of tests in progress at the same time
- Diagrams in real time of tests in progress
- Display and printout of test data and graphs
- Transducer calibration by software by polynomial equations
- Help key option available at any time to provide screen display of instruction
- Export of recorded data in ASCII code for further analysis
- Customised printout of test reports by a proper dedicated graphical editor

Ask for the GEO2000-DEMO CD software with customised printout

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30-T0601/A
8 channels expandable to 32

connectable to

**Controls make,
new or existing machine**

**Other makes of existing machines
with simple mechanical adapter**

to perform

**Consolidation
Direct shear
Multireversal residual shear
Unconfined
Triaxial UU-CU-CD
CBR**

with suitable strain gauge, LVDT or potentiometric transducers
(supplied by Controls or any other compatible source)
To measure

**Force
Displacement
Pressure
Volume change**

with the

GEOLAB 2000
Software integrated system
assuring the Highest flexibility

**Processing
and printout of test
certificates**

30-T0601/A
AUTOMATIC DATA ACQUISITION AND PROCESSING SYSTEM (CONTINUED)

General description and specifications

Hardware

- 8 measuring channels
- Compatible input signals: mV, V and mA
- Power output for transducers excitation: 10 V (mod. 82-P0908/A and 30-T0601/A) or 2 V (mod. 82-P0908/B). If needed power output can be adjusted at other rates by jumpers setting
- Individual jumper setting of transducer type (differential or single ended)
- A/D converter ± 32000 divisions
- Individual trimmer adjusting of zero point and slope (gain) for each channel
- RS 232 programmable serial output
- Real time clock and date
- 256 kB data memory
- 128 kB RAM memory
- 128x64 pixel back-light graphic display
- Easy operation with 4 function keys and numerical keypad
- Rigid case isolated for H.F. electric noise
- PS/2 sockets for transducers connection
- Sampling rate: up to 3 Hz (3 readings per channels per second)
- Power supply 110-240 V, 50-60 Hz, 1 ph.

Software: The new GEOLAB 2000 system

All the available programs: from 30-T0601/P1 to 30-T0601/P10 described below have been designed conforming to the latest requirement of the modern advanced laboratories.
They can be used for:
Consolidation tests – Triaxial tests (UU, CU, CD) controlled at each step (saturation, consolidation, failure) – Direct shear test – Residual shear test (multi-reversal test) – Unconfined compressive strength – CBR test.
The programs for the above tests have been

specifically designed to incorporate the majority of test procedures carried out throughout the world according to the International Standards.
The system, which is housed in a special console, is supplied as standard to accept up to 8 signals coming from as many transducers. Each one of these signals can be independently calibrated and reset. The monitor shows graphically the course of each selected test.

Complete configuration

The system is supplied for connection to a high resolution graphic printing unit. A typical system comprises:
- Computer
- Software programs. See 30-T0601/P1 to 30-T0601/R0
The system can be expanded by up to four units connected through a serial cable, corresponding to 32 channels. This new apparatus also has the advantage of being used without PC for manual processing of data or for using other processing systems. It is possible:
- To select the unit for each channel (e.g. N, kPa, mm, etc.)
- To select full range of every channel thus changing the transducer type
- To select different acquisition scanning
- To monitor channels involved in each test
- To print in real time the stored data of each test
- To display stored data of each channel.
PC and printer are not included.

■ 30-T0601/KEY
Protection key.
To be installed in the parallel port of PC to use the software.

n o t e

The system 30-T0601/A, complete with Geolab 2000 software package, requires a personal computer where Windows package (from 95 Release) must be available. The data transmission is carried out via the serial port RS 232.
All the recorded data and the general information of each test can be exported in ASCII code in order to be compatible, readable and processed by many software package MS-DOS or Windows compatible (Excel, Winword, Grapher, etc.).
A proper software package (see 30-T0601/R0) is devoted to customised printout of test reports, so that most high resolution printers are compatible. The system has to be completed with the protection key.

CBR test
Unconfined test

Triaxial tests
UU–CU–CD

Consolidation tests

Direct/Residual
shear tests

failure stage (direct and residual) for evaluation of peak and residual strength
4) Graphical representation of up to 6 shear/displacement curves from different shear tests
5) Plot of peak and residual shear stress against normal stress for up to 6 different tests with evaluation of both peak and residual failure envelopes formulated on the video display.

■ 30-T0601/P3

Unconfined and triaxial test program UU, CU, CD, data acquisition and processing
1) Time/pore pressure data and diagram for each saturation stage of CU and CD tests
2) Summary table of saturation data and computation of Skempton's B
3) Time/pore pressure, parameter time/volume change and time/settlement data and diagrams for each consolidation stage of CU and CD tests
4) Tabulated data for the failure stage of UU, CU, CD tests
5) For up to 6 different specimens tested at different effective (or total) confining pressure of UU, CU and CD tests, plots of the following data:
   - Stress/strain
   - Pore pressure/strain (CU tests)
   - Volume change/strain (CD tests)
   - Stress ratio/strain
   - Stress path
   - Mohr's circles
   - Evaluation of the shear strength parameters with the failure envelope formulated on the video display.

When used with 28-T0401/AC and 28-T0403/AC automatic triaxial machines, complete the software package with the following:

■ 30-T0601/IMP

Software to import data from automatic triaxial machines models 28-T0401/AC and 28-T0403/AC
It is required to make data compatible with the 30-T0601/P3 Software.

■ 30-T0601/P5

CBR test program, data acquisition and processing
1) Load and penetration table
2) Graphical representation of load versus penetration with the facility of correction of initial curve for determining CBR index at 2.5 and 5 mm.

THE NEW GEOLAB 2000 SOFTWARE

The software programs have been developed and conform to the recommendations of the most important International Geotechnical Institutions (eg.: UK Imperial College, MIT, ISSMFE, etc.) and provide the following diagrams and tables:

■ 30-T0601/P1

Consolidation test program, data acquisition and processing
1) Time/settlement data for each consolidation stage
2) Graphical representation of log time (or square root time)/settlement data, including the procedure to read off t_{100} (or t_{90})
3) Summary table of consolidation parameters calculated for each step of load/unload

4) Plot of the following final data
   - Vertical strain ε/log p'
   - Void ratio e/log p'
   - Constrained modulus log M/log p'
   - Coefficient of consolidation log Cv/log p'
   - Coefficient of permeability log K/log p'
   - Coefficient of secondary compression Cα/log p'

■ 30-T0601/P2

Direct/residual shear (multireversal) program, data acquisition and processing
1) Time/settlement data for each consolidation stage
2) Graphical representation of square root time/settlement data, including evaluation of t100
3) Displacement/shear stress data for the

■ 30-T0601/P10

Hydraulic consolidation cell test, data acquisition and processing
1) Summary table of volume change and pore pressure data
2) Graphical representation curve of volume change and pore pressure versus log time (or square root of time) including the procedure to identify the end of consolidation.

■ 30-T0601/R0

Additional software package for customised printout

This package includes a dedicated editor specially designed as a tool for customised printout. The user can introduce and position on each certificate all the subsidiary information and data that he requires to print. E.g.: logo of the laboratory, name of the technicians, test code, certificate number, reference standards, different format and physical units of data, etc.

Different printout configurations can be easily set up, stored and recalled for automatic customised printout.

The most important advantage of this package is that, provided the main software is displayed in English (or French, or Spanish, or Italian), **each single certificate can be stored and printed in local language** directly by the user.

The package is supplied complete with examples of customised certificates that for the majority of application do not need any change (only translation may be required by the customer).

CALIBRATION DEVICE

FOR LINEAR TRANSDUCERS

■ 30-T0652

Calibration device for linear transducers

It consists of a stainless steel frame with two holders: one for the transducer and the other for the micrometer gauge head. The holder can receive transducers having nominal diameter of 8, 12, 19 or 22 mm. Traceable calibration certificate available upon request.

Weight approx.: 1 kg

EXTENSION CABLES

■ 30-T0600/30

Transducer extension cable, 6 m

■ 30-T0600/31

Transducer extension cable, 12 m

CONNECTION BOX

■ 30-T0601/LINK

Connection box for multiple system
Connection box and cable, to connect from 2 to 4 30-T0601/A Dataloggers to PC.

Displacement transducer 82-P0334 during calibration using the 30-T0652 device

SIGNAL SIMULATOR

■ 82-P0402

Signal simulator

For load cells and pressure transducers strain gauge type. It can be used for checking the linearity of measuring instruments with digital display (e.g. Digimax, Datamatic, Dataloggers, etc.).
The simulator applies four levels of unbalance of Wheastone bridge in order to simulate pressures or loads: 0 – 0.50 – 1.00 – 2.00 mV/V.
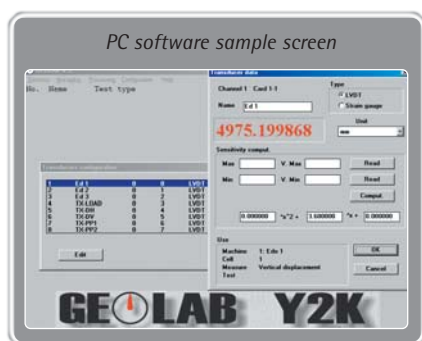In this way it is possible to control the calibration without applying any pressure or load. Supplied complete with 6-pins adapter.

Weight approx.: 0.5 kg

Accessories

▼ **82-P0402/1** Adapter 5/6-pins suitable for all our instruments

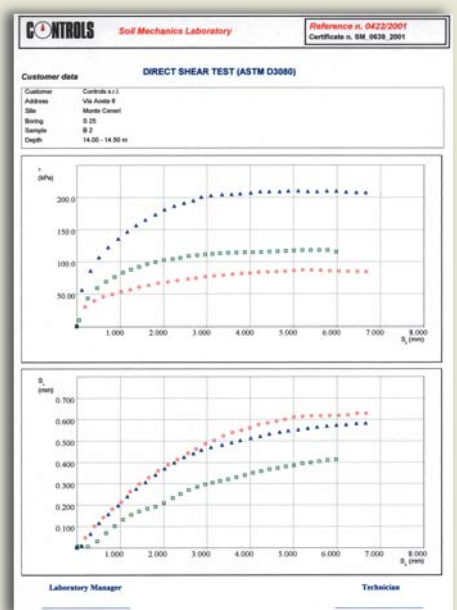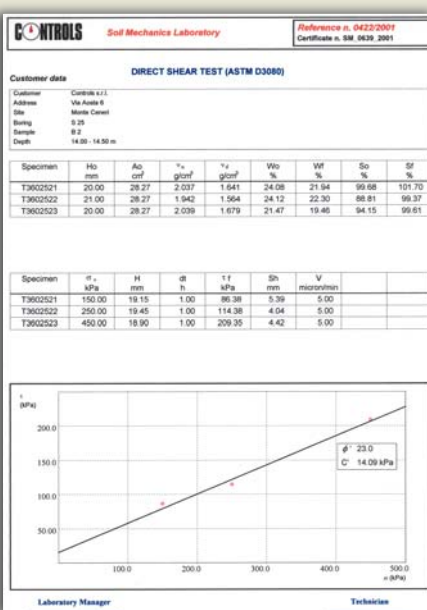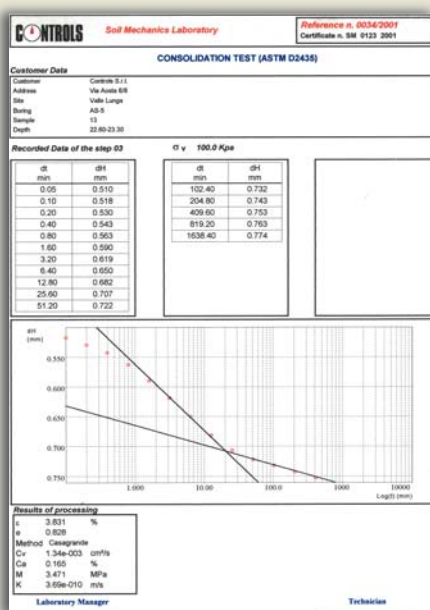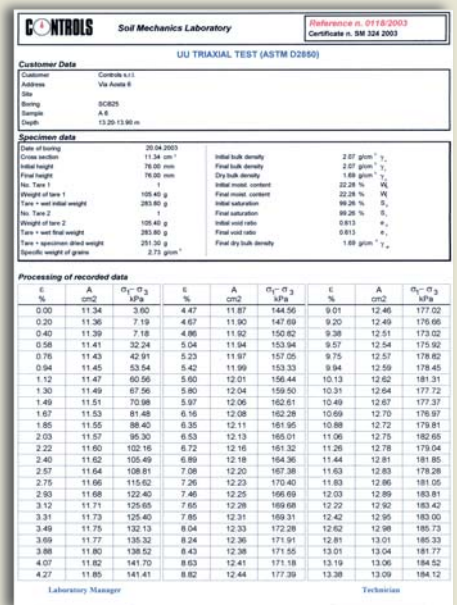**Note.** Special adapters and connections are available on order.

PC software sample screen

GE◉LAB Y2K

82-P0402

SOFTWARE (CONTINUED)

EXAMPLES OF CUSTOMISED PRINTS
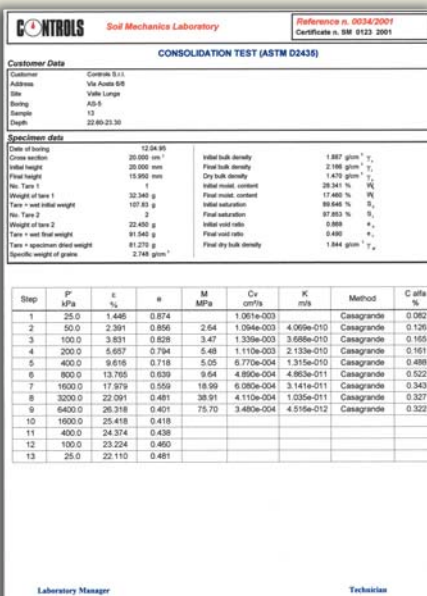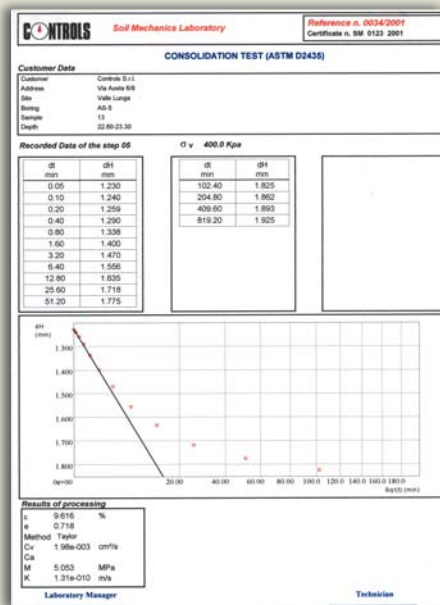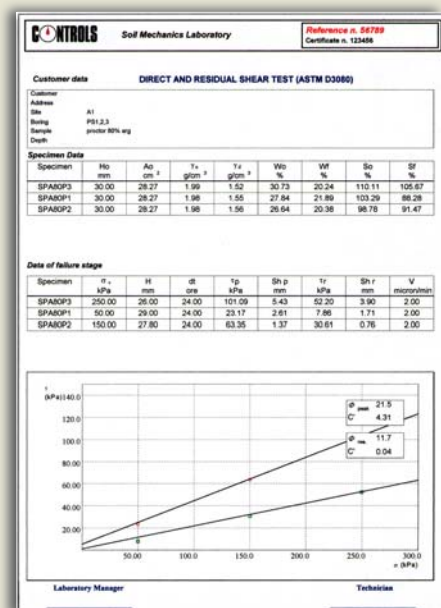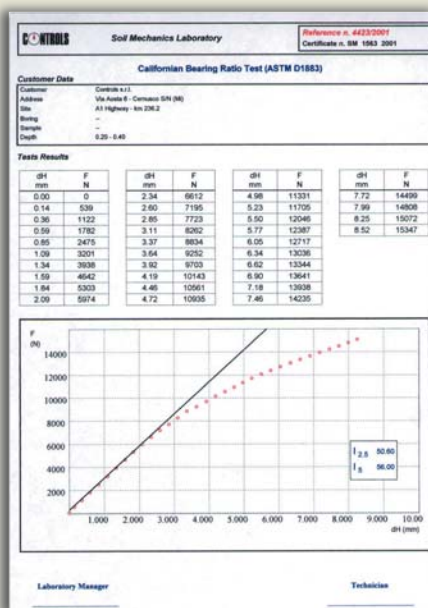
Consolidation test with hydraulic cell → 7
Consolidation test by oedometers → 6
Direct and residual (multireversal) shear test → 5
Triaxial test CD → 4
Triaxial test CU → 3
Triaxial test UU/unconfined → 2
CBR test → 1

SUMMARY

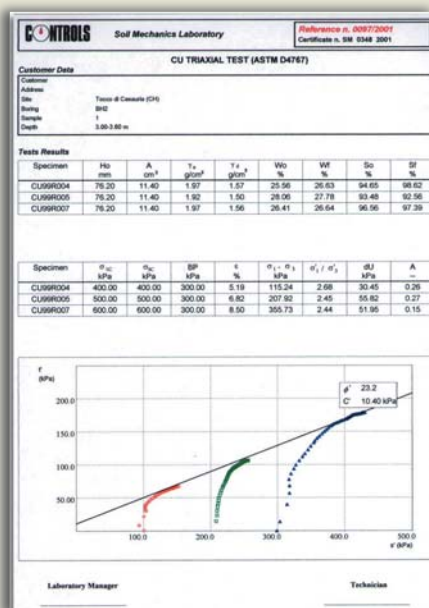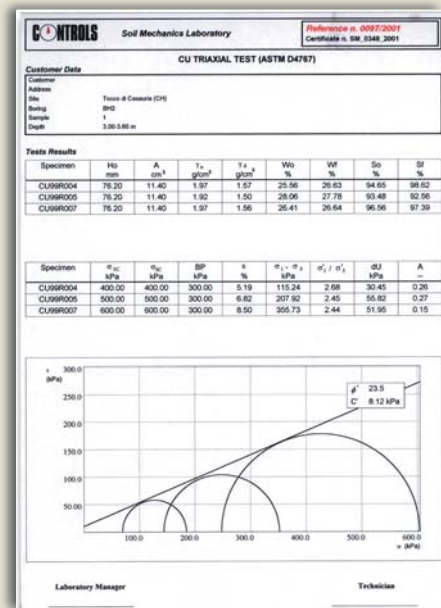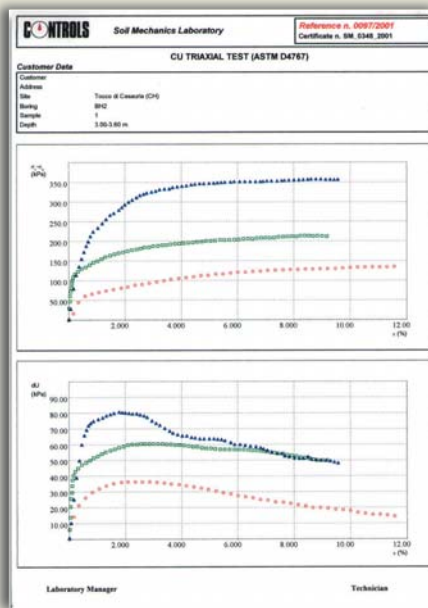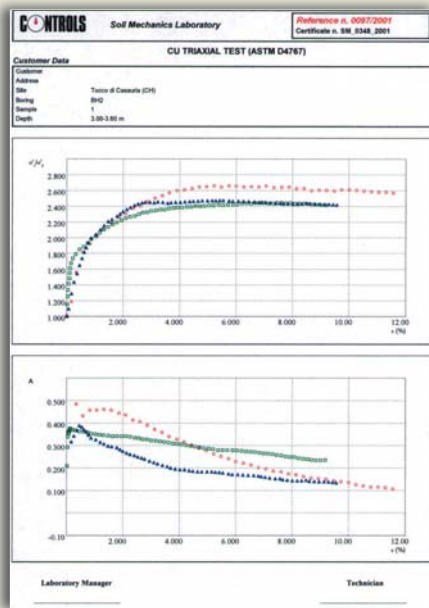These items are needed to complete the testing machines and apparatus for connection to 30-T0601/A Geolab 2000. They can be fitted to all Controls apparatus and to most other makes provided that we receive the necessary information.

Legend

● Base apparatus

○ Alternative transducer models and accessories

□ Optional package for customised test certificate printout (also in local language)

♦ Quantity depending upon measuring points

	Code	1	2	3	4	5	6	7
Data acquisition								
Automatic data acquisition and processing unit, 8 channels	30-T601/A	●	●	●	●	●	●	●
Personal computer		●	●	●	●	●	●	●
High resolution printer		●	●	●	●	●	●	●
Extension cable for transducer, 6 m	30-T600/30	♦	♦	♦	♦	♦	♦	♦
Extension cable for transducer, 12 m	30-T600/31	♦	♦	♦	♦	♦	♦	♦
Transducer								
Electronic load ring for triaxial, 2 kN	82-T1002/E		●	●	●			
Electronic load ring for triaxial, 5 kN	82-T1003/E		○	○	○			
Electronic load ring for triaxial, 10 kN	82-T1004/E		○	○	○			
Electronic load ring for CBR, 50 kN	82-T1009/E	●						
Strain gauge load cell for triaxial, 2.5 kN	82-P0370/T		○	○	○			
Strain gauge load cell for triaxial, 10 kN	82-P0373/T		○	○	○			
Strain gauge load cell for triaxial, 50 kN	82-P0375/T		○	○	○			
Strain gauge load cell for CBR, 50 kN	82-P0375	○						
Submersible load cell, 3 kN	28-T0418/1		○	○	○			
Submersible load cell, 5 kN	28-T0418/2		○	○	○			
Submersible load cell, 10 kN	28-T0418/C1		○	○	○			
Submersible load cell, 26.5 kN	28-T0418/D2		○	○	○			
Electronic linear transducer, 10 mm	82-P0330					●	●	●
Electronic linear transducer, 25 mm	82-P0332	●	●	●	●	○		
Electronic linear transducer, 50 mm	82-P0334	○	○	○	○			
Pore pressure transducer, 10 bar	82-P0349			●	●			●
Pore pressure transducer, 20 bar	82-P0350			○	○			
Volume change apparatus, 90 cm3	28-T0494			●	●			
Elect. load ring for shear testing, 1 kN	82-T1001/SAE					○		
Elect. load ring for shear testing, 2 kN	82-T1002/SAE					○		
Elect. load ring for shear testing, 5 kN	82-T1003/SAE					○		
Strain gauge load cell for shear testing, 3 kN	27-P0376/S					●		
Strain gauge load cell for shear testing, 5 kN	27-P0377/S					○		
Transducer accessories								
Conical seat for triaxial load rings	28-T1049		●	●	●			
Mounting bracket for displacement transducers	28-T1048		●	●	●			
Panel with reversing valve system	28-T0494/1			●	●			
De-airing block for pressure transducer	28-T0477/4			●	●			●
Extension rod for submersible transducer	28-T0418/5			○	○			
Mounting bracket for 25 mm displ. transducer	27-P0332/AS					○		
Mounting bracket for CBR displ. transducer	34-T0104/8	●						
Connecting adaptor for CBR load cell	82-P0375/C	●						
Software								
CBR (California Bearing Ratio)	30-T0601/P5	●						
Triaxial (UU, CU, CD, Unconfined)	30-T0601/P3		●	●	●			
Direct and residual (multirev.) shear test	30-T0601/P2					●		
Consolidation (Oedometer)	30-T0601/P1						●	
Consolidation (Hydraulic cell)	30-T0601/P10							●
Customised printout (1 common for all packages)	30-T0601/R0				□			
Protection key (1 unit common for all packages)	30-T0601/KEY				●			