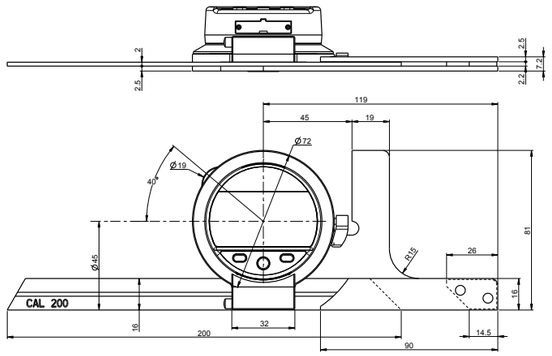
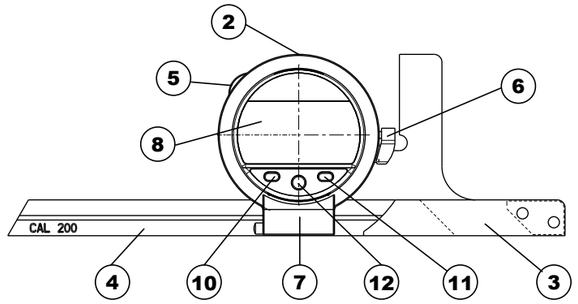
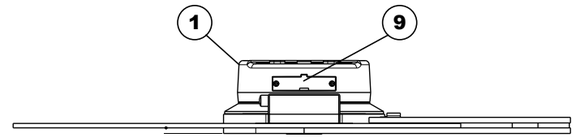
## Installing and replacing the battery

## Outline dimension drawing




## General description



1. Electronic module
2. Proximity entry
3. Reference blade
4. Rotating blade
5. Fine adjustment
6. Lock nut
7. Blade clamping plate
8. Multifunctional display
9. Pull-out slide for battery
10. Mode button
11. Set button (ON/OFF)
12. Favourite key

## Operating features of the instrument

- MODE — The instrument has two operating modes: basic functions (direct access) and advanced functions. In addition to the configuration functions, 3 different measuring modes can be accessed, in MIN, MAX and DELTA (TIR) mode (depends on model), plus tolerance display. (see «Basic and Advanced functions»)
- ◈ — The «favourite» key gives direct access to the function used most often (see «Favourite Key»)
- SET — Sets a Preset value, reset the MIN/MAX mode, verifies a selection, and controls switching off the instrument. By default, SIS mode enables automatic switch-off with no loss of origin (see «Switching off»)

**- Personalising the functions**

It is possible to activate or de-activate certain functions of the instrument via RS232 (PC)
(see «Personalising the instrument»)

**- Data transmission parameters**

4800Bds, 7 bits, even parity, 2 stop bits

**- Start**

Press a button.
For a *Bluetooth*® connection see «Bluetooth® configuration» (depends on model)

## *Bluetooth*® configuration (depends on model)

The connection procedure has been designed to be simple and is signalled by the following three states :

1° Symbol ᛒ off.....disconnected mode
2° Symbol ᛒ blinking .....advertising mode
3° Symbol ᛒ on.....connected mode

**Connection :**

1° Activate *Bluetooth*® compatible software and hardware (Master : PC, Display Unit)
2° Start the instrument. By default the *Bluetooth*® module is active and the instrument is available for connection during 120s (advertising mode)
3° As soon as the device is detected, a connection is established automatically. If no connnection is established during 120s, reactivate the *Bluetooth*® module using the bt / On menu.
4° Instrument is ready to communicate (connected mode)

**Pairing :**
Pairing with master is automatically done at first connection.

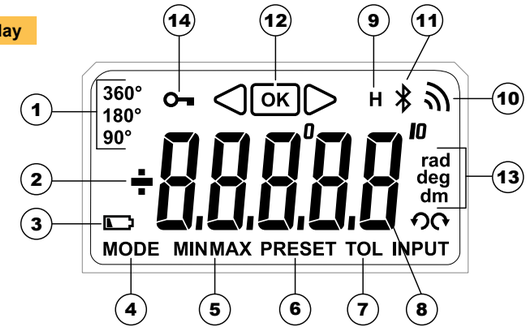
To connect the instrument to a new master (new pairing), it is necessary to clear all pairing information on the instrument using the bt / rESEt menu.

**_Bluetooth_® specifications**

| | |
|---|---|
| Radio frequency | 2.4Ghz |
| Robustness | FHSS |
| Latency (from not connected state to send data) | <6ms |
| Range | Open space: up to 15m<br>Industrial environment: 1-5m |
| Autonomy | Continuous : up to 2 months - Always connected with 4 values /sec<br>Saver : up to 5 months - The instrument sends value only when the position has changed<br>Blind/Push : up to 7 months - Value is sent from the instrument (button) or requested from the computer |

Other specifications on the manufacturer's website

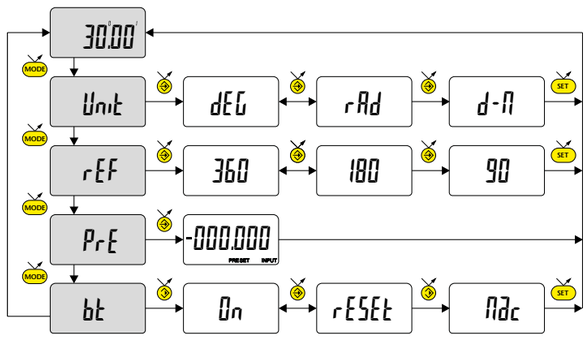
## Display




1. Indicator of measuring range (90°/180°/360°) / **2. +/- Indicator** / 3. Low battery
**4. Mode menu display** / 5. MIN/MAX/DELTA mode / 6. **Preset mode** / 7. Tolerance mode
**8. 5-digit display** / 9. Hold measured value / **10. Send data** / 11. *Bluetooth*® active (depends on model) / **12. Tolerance indicators** / 13. Measurement units (rad/deg/dm)
**14. Button lock**

## Basic functions

Each short press on MODE gives direct access to the basic functions :




Unit : units selection (dEG, rAd or d-M)

rEF : choice of reference (360°, 180° or 90°) (depends on model)

PrE : Inputting a Preset value

Next digit SET 0...9 MODE save Preset

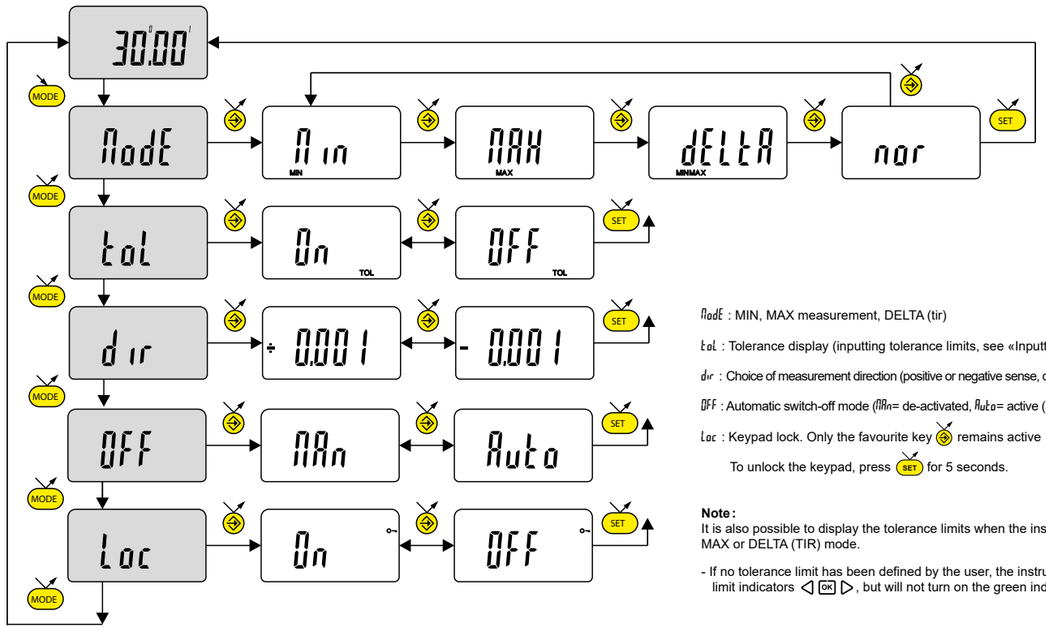
bt : activates, deactivates or reset Bluetooth® (depends on model)

dir : Choice of measurement direction (only on model without Bluetooth®)

## Advanced functions (depends on model)

Prolonged pressure (>2s) on MODE gives access to the advanced functions.

Then, each short press on MODE accesses the required function :




ModE : MIN, MAX measurement, DELTA (tir)

toL : Tolerance display (inputting tolerance limits, see «Inputting the Tolerance limits»)

dir : Choice of measurement direction (positive or negative sense, depends on model)

OFF : Automatic switch-off mode (MAn= de-activated, Auto= active (after 20min))

Loc : Keypad lock. Only the favourite key ◈ remains active

To unlock the keypad, press SET for 5 seconds.

**Note :**
It is also possible to display the tolerance limits when the instrument is operating in MIN, MAX or DELTA (TIR) mode.

- If no tolerance limit has been defined by the user, the instrument will display the tolerance limit indicators ◁ OK ▷, but will not turn on the green indicator light.

# PROTRACTOR

E

**User guide**

Edition : 2017.05 / 681.239-100

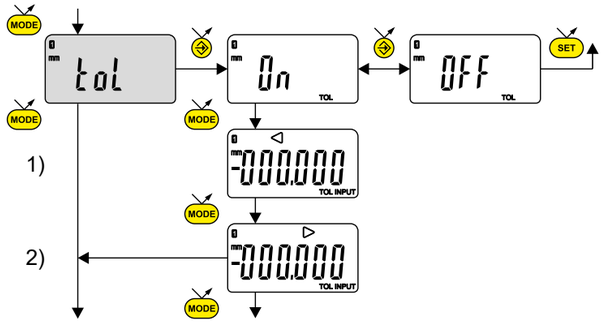
Firmware version : r2.04r 26.04.2017

Note: BLUETOOTH® instruments and accessories are only available in countries for which certification has been obtained (UE, USA, JP, CN, TW etc.). Look at our website: www.sylvac.ch, for the list of countries that have obtained certification. If your country is not on the list, please contact your local Sylvac reseller.

Changes without prior notice

## Inputting tolerance limits

To input or modify the tolerance limits, tol → On mode should be selected, followed by a short press on : MODE




1) Input the lower tolerance limit ◁

2) Inputting the upper tolerance limit ▷

Next digit SET 0...9 MODE save tolerance limits

**Note :**

Because of 360° rotating system, tolerance indicators work in Go-NoGo mode:

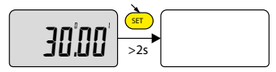
Inside tolerances limits OK (green light)

Outside limits: NoGo indicators ◁ ▷

## Switching off

The protractor goes automatically into stand-by if not used for 20 minutes, unless automatic switch-off mode has been turned off (see «Advanced functions»)

Stand-by mode can be forced by a prolonged press (> 2 sec) on : SET




In stand-by mode, the value of the origin is retained by the sensor (SIS mode), and the instrument automatically restarts with any movement of the measurement probe, RS command, Bluetooth® request or press a button.

The instrument can be switched off completely for a long period of non-use, but this will necessitate a zero reset on restart (the origin will be lost):

- Prolonged press (>4 sec) on SET

## Re-initialising the instrument

The initial instrument settings can be restored at any time by a prolonged press (>4 sec) simultaneously on MODE and SET until the message rESEt is displayed.

## Personalising the instrument

Access to the functions of your instrument can be personalised, for more information see manufacturer's website (requires you to connect your instrument via Proximity or Power RS / USB cable, or *Bluetooth*® (depends on model)).

Possibilities :

- De-activate or active the required functions
- Modify access to the advanced functions (direct access)

## Certificates

The Bluetooth® word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by Sylvac is under license. Other trademarks and trade names are those of their respective owners.

**U.S./Canada Certification**

Sylvac
m.n : Protractor

This device contains
FCC ID: 2AAQS-ISP091201
IC: 11306A-ISP091201

**NOTICE :**
Changes or modifications made to this equipment not expressly approved by Sylvac may void the FCC authorization to operate this equipment.

**NOTICE :**
This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions.
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

**NOTE :**
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Radiofrequency radiation exposure Information :**
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**Brazil Certification**

**Description :**
This module is based on Nordic Semiconductor nRF8001 µBlue Bluetooth Low Energy Platform. The nRF8001 is a single chip transceiver with an embedded baseband protocol engine, suitable for ultra-low power wireless applications conforming to the Bluetooth Low Energy Specification contained within v4.0 of the overall Bluetooth specification. The nRF8001, used in the current revision of ISP091201, is a production product using a RoM for the baseband protocol engine.

Este equipamento opera em caráter secondário, isto é, nãotem direito à proteção contra interferência prejudicial, mesmo de estações do mesmo tipo e não pode causar interferência a sistemas operando em caráter primário.

ANATEL
MODELO: ISP091201D
0516-14-4534

**Mexico certification**

**Contiene modulo inalámbrico**
**Marca: Sylvac**
**Modelo: ISP091201D**
**IFT: RCPSYIS14-0655**

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

**Korea South certification**

MSIP-CRM-iNs-ISP091201

Class A Equipment (Industrial Use)

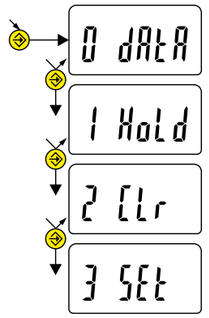
이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

**Japan certification**

R 001-A06167

## Favourite key

The «favourite» key gives direct access to a predefined function, and can be configured according to the needs of the user. In order to assign a function to the «favourite» key, give a prolonged press on and then select the required function :

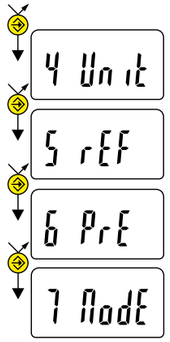



Data transmission (default)

Hold display

Re-initialise Min-Max-Delta

Zero reset

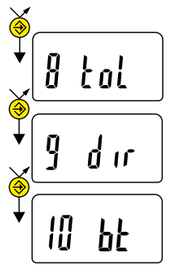



deg - rad - dm

REF1 - REF2 - REF3 (90° - 180° - 360°)

Recall Preset

Nor-Min-Max-Delta (depends on model)




Tol ON - Tol OFF (depends on model)

Measurement sense, positive or negative

Bluetooth® (depends on model)

Validation of selection: By a prolonged press on or a short press on SET or MODE

**Note :** a function can also be assigned via RS232 using the command <FCT + Function No.>
example : Change of Unit = **<FCT4>**

## List of the main commands (depends on instrument)

| **Selection and configuration** | |
|---|---|
| CHA+ / CHA- | Change measurement direction |
| FCT0 ...9...A...F | Assign «favourite» function |
| DEG / DMIN / RAD | Change measurement unit |
| KEY0 / KEY1 | Lock / unlock keypad |
| MUL [+/-]xxx.xxxx | Modify multiplication factor |
| PRE [+/-]xxx.xxx | Modify preset value |
| REF1 / REF2 / REF3 | Change active reference (90°, 180°, 360°) |
| STO1 / STO0 | Activate / de-activate HOLD |
| TOL1 / TOL0 | Activate / de-activate tolerances |
| LCAL dd.mm.yy | Modify last calibration date |
| NCAL dd.mm.yy | Modify next calibration date |
| NUM xxxxxxxxx | Serial number |
| TOL +/-xxx.xxx +/-yyy.yyy | Inputting tolerance limits |
| MIN /MAX /DEL /NOR | Selecting MIN, MAX, Delta, Normal mode |
| CLE | Re-initialisation of MIN, MAX or Delta |
| UNI1 / UNI0 | Activate / de-activate change of units |
| OUT1 /OUT0 | Activate / de-activate contin. data transmission |
| PRE ON / PRE OFF | Activate / de-activate Preset function |
| PRE | Recall Preset |
| SET | Zero reset |
| BT0/BT1 | Activate / de-activate Bluetooth® module |
| BTRST | Reset pairing information |

| **Interrogation** | |
|---|---|
| CHA? | Measurement sense? |
| FCT? | «favourite» function active? |
| UNI? | Measurement unit active? |
| KEY? | Keypad locked? |
| PRE? | Preset value? |
| REF? | Reference active? |
| TOL? | Current tolerance limit values? |
| LCAL? | Date of last calibration? |
| NCAL? | Date of next calibration? |
| NUM? | Serial number? |
| ? | Current value (mode Tol, value followed by <.=) |
| MOD? | Active mode (MIN, MAX, Delta or Normal)? |
| SET? | Main instrument parameters? |
| ID? | Instrument identification code? |

| **Maintenance functions** | |
|---|---|
| BAT? | Battery status (BAT1 = OK, BAT0 = low battery) |
| OFF | Switch-off (wake up using a button or RS) |
| RST | Re-initialisation of the instrument |
| SBY | Put instrument in stand-by (SIS) |
| VER? | Version No. and date of firmware |
| MAC? | Bluetooth® MAC address ? |

## Connecting the instrument

The instrument can be connected to a peripheral via a Proximity (RS or USB), Power (RS or USB) cable or *Bluetooth*®. See «installing and replacing the battery» for connecting the Power cable.

Measured values can be transmitted and the instrument driven using predefined commands (see «List of the main commands»)

**Note**:
In Tolerance mode, the tolerance limit light remains lit only for a few seconds while the measurement stabilises. On the other hand, it will remains lit continuously if the instrument is connected to, and powered by, the Power RS (USB) cable.

PROXIMITY POWER Bluetooth®

## Specifications

| | |
|---|---|
| **Measuring range** | 1x360°, 2x180°, 4x90° |
| **Resolution** | 0.01° / 1 minute of arc (0°01') / 0.0001rad |
| **Accuracy** | 4 minutes of arc / 0.06° / 0.0012 rad |
| **Repeatability** | 0.01° |
| **Maximum operation speed** | 1080° / s |
| **Display refresh rate** | 8 / s |
| **Measuring unit** | deg / dm / rad |
| **Measuring system** | System system (patented) |
| **Stand-by SIS (automatic after 20')** | Keep origin, wake up with movement |
| **Power** | 1 lithium battery 3V type CR2032, capacity min : 220mAh |
| **Average consumption (measure)** | 75µA |
| **Battery life** | Average battery life: 7'000 hours / Bluetooth® 3'650 hours |
| **Working temperature** | +5 to +40° C / +41 to 104° F |
| **Output** | Compatible RS232, Proximity connection, Bluetooth® (depends on model) |
| **Protection according to IEC 529** | IP51 (IEC 529) |
| **Weight** | 410g |