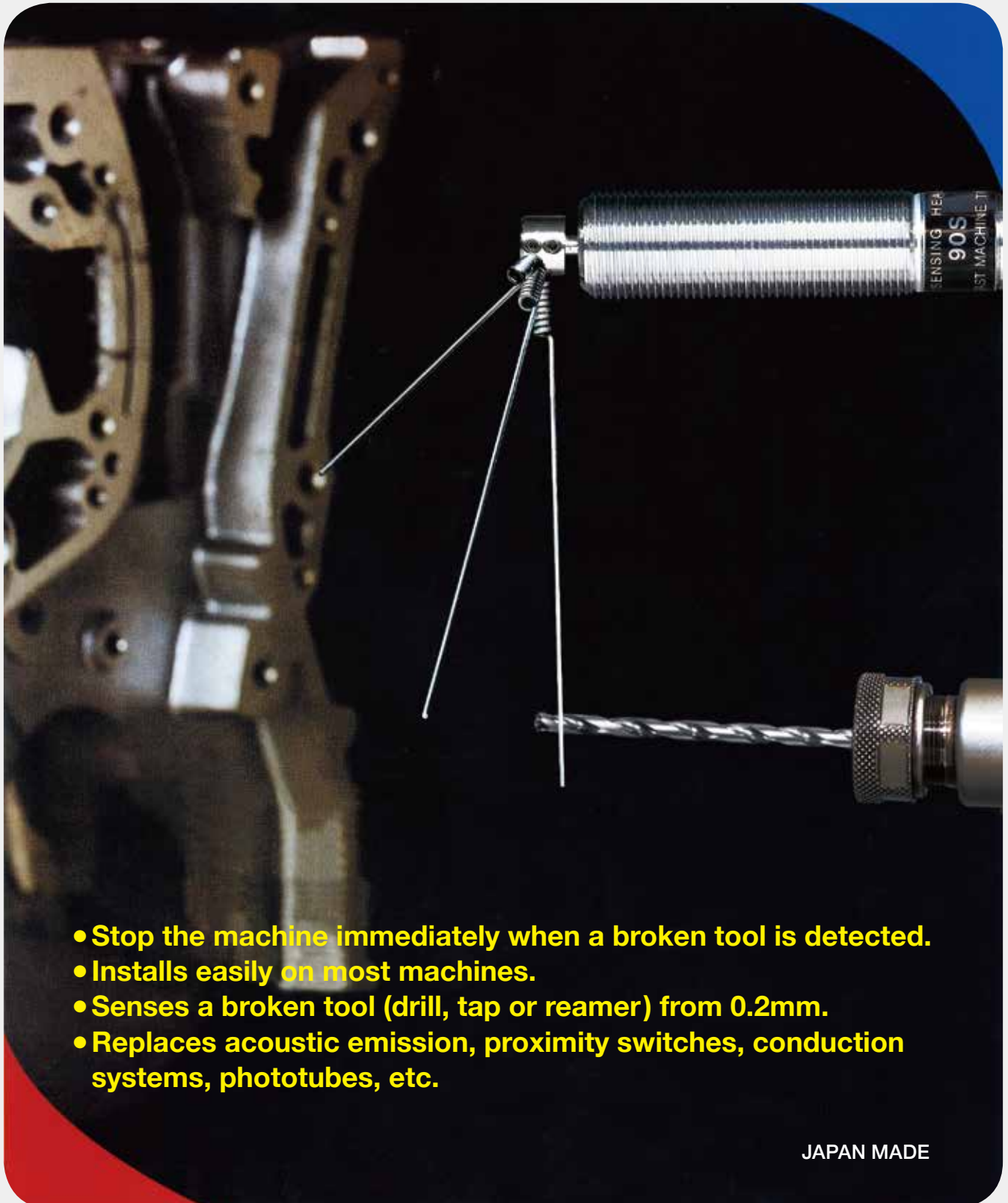


FEM BROKEN TOOL SENSING DEVICE (Microcomputer Controlled)

Used by the leading automobile makers all over the world



- Stop the machine immediately when a broken tool is detected.
- Installs easily on most machines.
- Senses a broken tool (drill, tap or reamer) from 0.2mm.
- Replaces acoustic emission, proximity switches, conduction systems, phototubes, etc.

JAPAN MADE

FEATURES OF THE FEM BROKEN TOOL SENSING DEVICE

The FEM sensing device is unique—Unlike any other broken tool sensing device on the market today. The FEM will cut your costs by detecting a broken tool early, preventing the loss of expensive parts, thereby decreasing your operating cost and increasing your profitability.

The function of the FEM can be vitally important when used on NC LATHE, NC DRILLING MACHINE, ROTARY INDEX MACHINE, TRANSFER MACHINE, NC MACHINING CENTER, MULTIPLE SPINDLE DRILLING MACHINE and TAPPING MACHINE.

The FEM is also excellent for AUTOMATIC ASSEMBLY MACHINE.

There are infinite other uses. Let your needs and imagination guide you.

Detecting a broken tool is accomplished by determining the rotation angle of the sensing needle. This needle is driven by a high-precision, Swiss-made DC motor, and rotates to lightly touch the tool. If the tool is broken, the sensing needle will fully rotate and shut down the machine automatically.

The output signals of OK or NG are determined by a change in resistance of the DC motor. Thus there are no internal contacts to tarnish, wear out or break.

The FEM control unit's IC circuits and microcomputer guarantees quality and reliability.

Each sensor can have its own direction (CW or CCW), its own rotating angle and its own reset function ("A" or "B").

The sensing head of the FEM is fully sealed so there are no side effects from cutting oil, coolant chips or vibration from the machine. The sensor is easily installed by simply connecting two wires. The tool can be extended to 20m from the control unit, and even longer cables are available.



FEM BROKEN TOOL SENSING DEVICE FEM-1CPS

The FEM broken tool sensing device includes a control unit and a sensing head.

- **ROTATING ANGLES OF THE SENSING HEAD**

There are five rotating angles of the sensing head (45°, 60°, 90°, 120° and 180°). The rotation of the sensing needle can easily be directed to CW (clockwise) or CCW (counterclockwise).

- **ADJUSTMENT AND REPLACEMENT OF THE SENSING NEEDLE**

The standard length of the sensing needle is 100mm min. and 150mm max.

The sensing needle is attached to the head cap by means of two set screws.

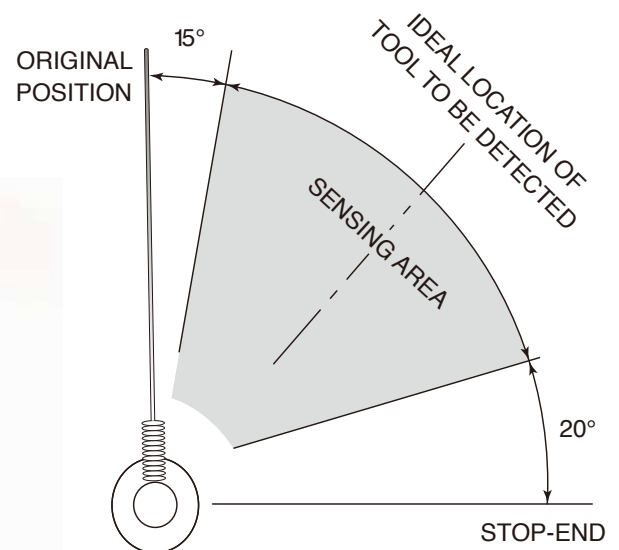
The head cap and motor axis can easily be set at any position by a simple set screw adjustment.

- The FEM is designed to be safe in any machine operation. In case of a disconnect or a short circuit, the red LED on the panel of the control unit will blink and the machine will stop immediately.

SENSING AREA: (See Illustration)

The sensing area is 15° from where the Sensing head begins its sweeping motion, and to within 20° of the stop end of the motion.

In order for the self-monitoring function of the device to operate properly, adjust the needle cap so that the tool to be detected falls as close as possible to the center of the full angle of the sensing area.



EXAMPLE:
90°CW DIRECTION





FEM-1CPS



45S, 60S, 90S, 120S & 180S

● **SELF-MONITORING FUNCTIONS**

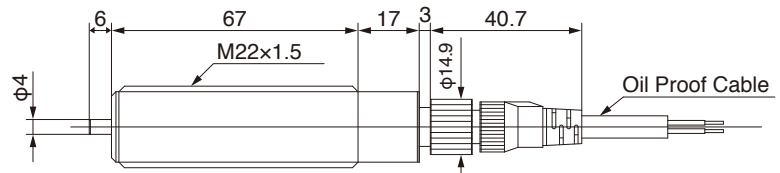
The FEM broken tool sensing device has a built-in self-monitor. This feature checks for breaks or shorts in the cable wire, changes in the sensing head voltage, rotation speed of the sensing head and a return to starting position of the sensing needle.

● **RESET FUNCTIONS**

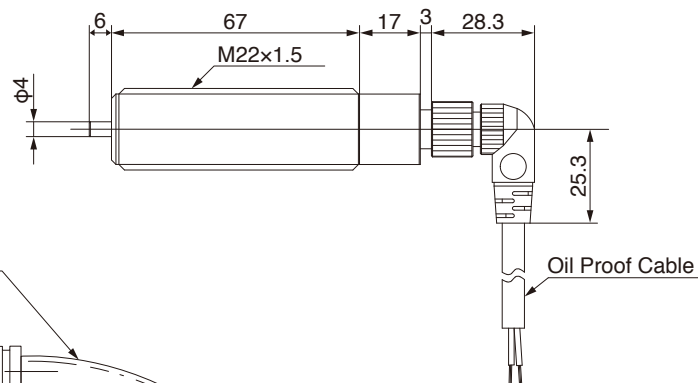
The two reset function of the FEM broken tool sensing device determine the length of the output signals. The output signal can be continuous or brief depending on your needs.

SENSING HEAD

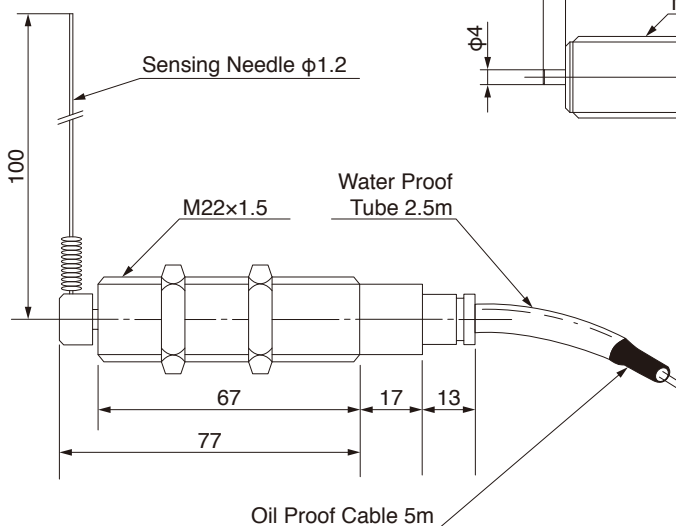
【Connector type straight】



【Connector type L】

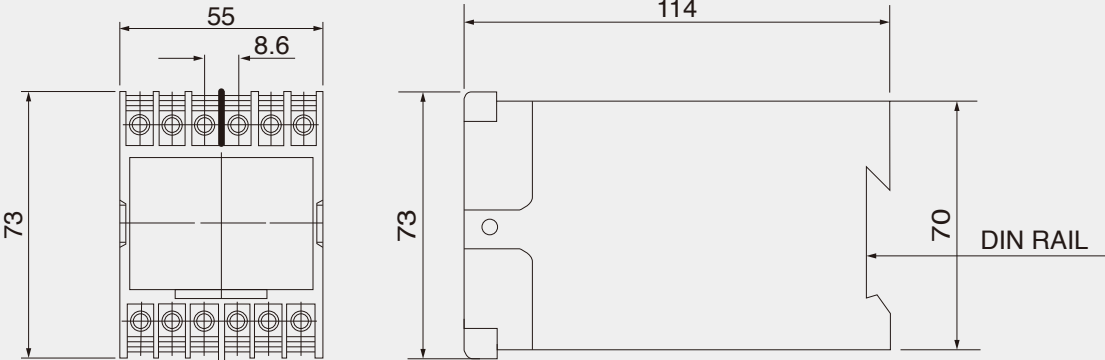


【Integrated】

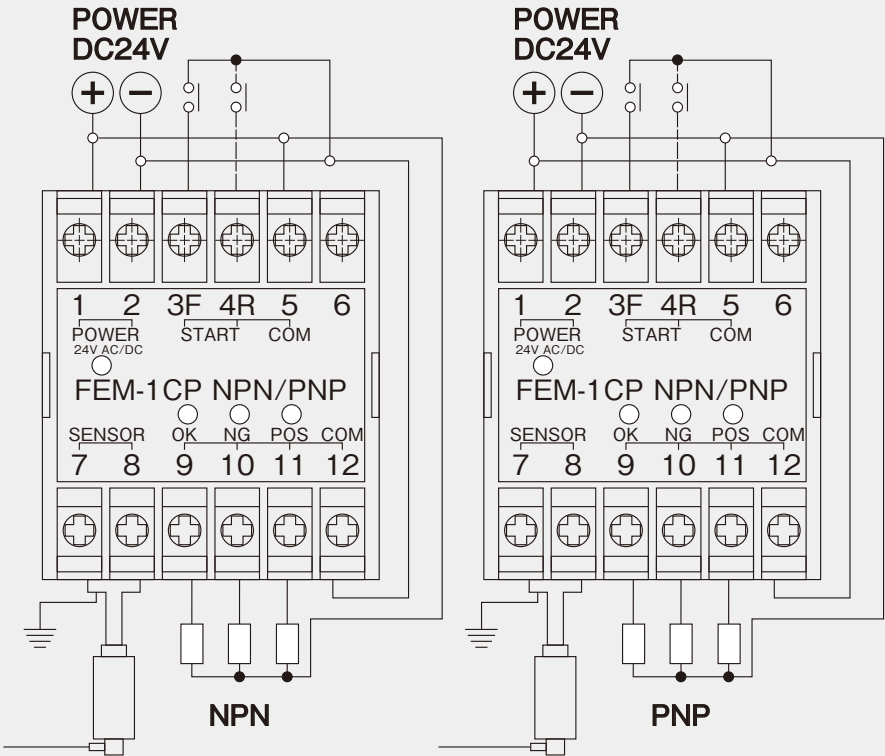


CONTROL UNITS MEASUREMENTS

FEM-1CP CONTROL UNIT (for one sensing head)



CONTROL UNITS CONNECTING TERMINALS



SPECIFICATIONS OF FEM BROKEN TOOL SENSING DEVICE CONTROL UNIT (FEM-1CP) AND SENSING HEAD (FEM-1S)

CONTROL BOX	UL approved. DIN rail grooves				
POWER	24V AC/DC (10%) 150mA				
INPUT (Start)	Contact capacity DC 24V 11mA				
SELF-MONITOR	A circuit to detect any irregularities in the sensing head.				
INDICATORS	Luminous LED Yellow : Power Green : OK (Good) Red : NG (NO good) Green : POS. (Position) Flashing Red : Self-Monitor				
DIRECTION OF ROTATION (CW of CCW)	Can be selected on DIP switch				
TERMINALS	12 terminals				
TEMPERATURE (Work Area)	0°C ~ +50°C (do not freeze)				
HUMIDITY (Work Area)	35-85% RH (do not frost)				
RESET FUNCTIONS	"A" reset and "B" reset				
DETECSION TIME	45S = 0.44"	60S = 0.45"	90S = 0.51"	120S = 0.6"	180S = 0.62"
SENSING HEAD FEM-1S					
HOUSING	Brass, chrome plated				
MOTOR	DC motor, high precision, Swiss made				
WATERPROOFING	ISO specification of IP 67				
DEGREES	Available in 45°, 60°, 90°, 120° and 180°				
CABLE	OIL PROOFED. 5m length as standard.				
TEMPERATURE	0°C ~ +50°C (do not freeze).				
SENSING NEEDLE					
MINIMUM LENGTH	100mm (Standard round of plate)				
MAXIMUM LENGTH	150mm (round of plate)				

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