Built-In Type ATC Run-Out Detection System

Aluminum high-speed cutting process monitoring device

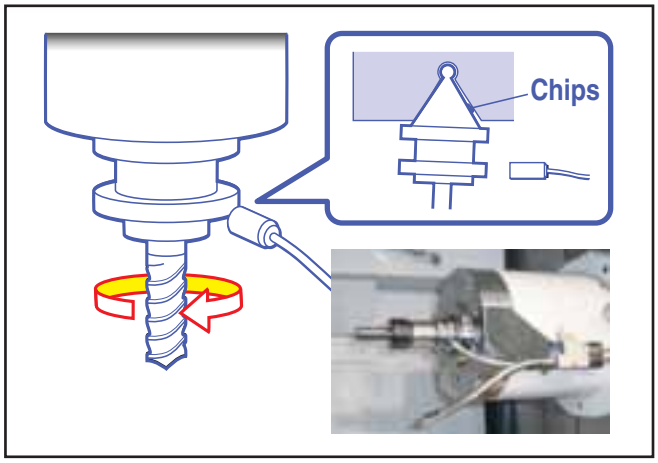
Built-In Type ATC Run-Out Detection System

Sudden machining defects. Aren't they being caused by chips in the tool chuck?

NEW

How do chips in the tool chuck cause defects?

In an ATC machining center, defects can be generated during ATC when chips get into the space between the tool taper and the main spindle. For years, machining centers have looked for a solution to this problem, which is particularly prevalent during high-speed cutting of aluminum.



■ Monitoring high-speed cutting of aluminum

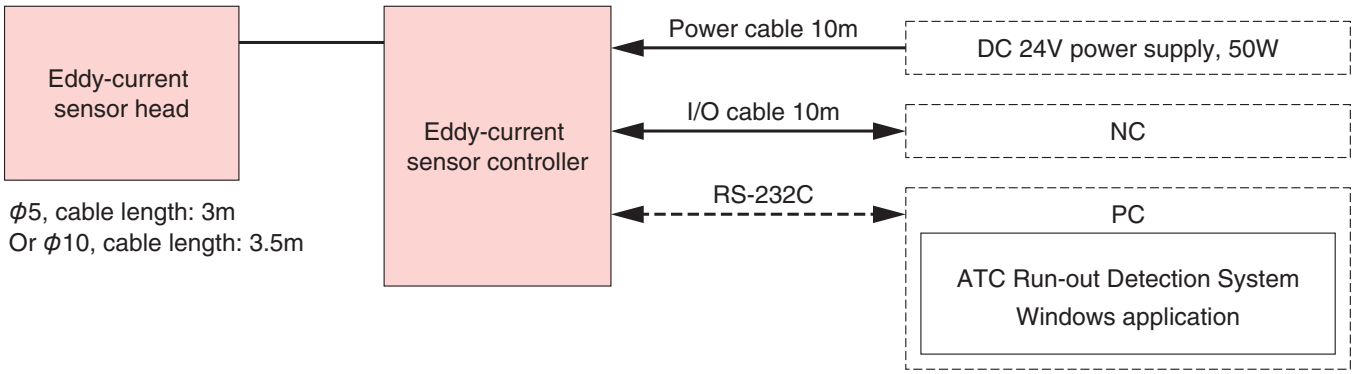
Because of shorter processing times, reductions in the amounts of coolants, and other aluminum process demands, the frequency of chips getting into the tool taper during ATC is increasing. During high-speed cutting of aluminum in particular, a measurement instrument must be able to detect 100% of chip invasion into the tool taper, so defects are not generated.

■ 0.3 second measuring time

An eddy-current sensor allows measurement in a mere 0.3 seconds (at 600 rpm). Since the measuring tool is selectable, measuring time is not affected by the cycle time. A dedicated run-out detection system algorithm (patent pending) calculates true run-out for detection capability that cannot be achieved by commercially available eddy sensors. All of this means that the system delivers precise, reliable detection in an automated line.

■ Low cost, integrated type

By connecting a PC to this device, you can set up parameters and collect measurement data. This device need not be connected to a PC when performing regular measurement. All NC communication has been incorporated in to the OK/NG functions, which greatly reduces cost. Because of all of this, this system is being adopted by many machine tool manufacturers.



ϕ5, cable length: 3m
Or ϕ10, cable length: 3.5m

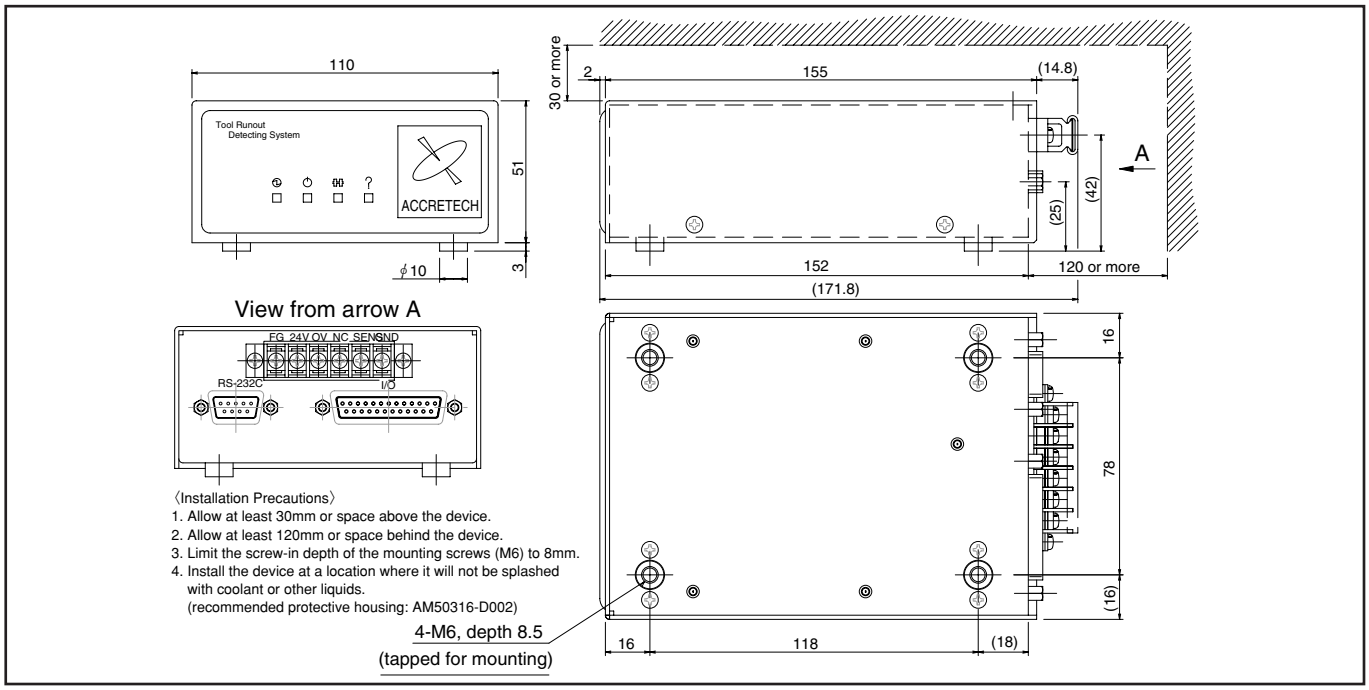
Items enclosed in dotted lines are provided by the end user.

* Windows application provided as standard

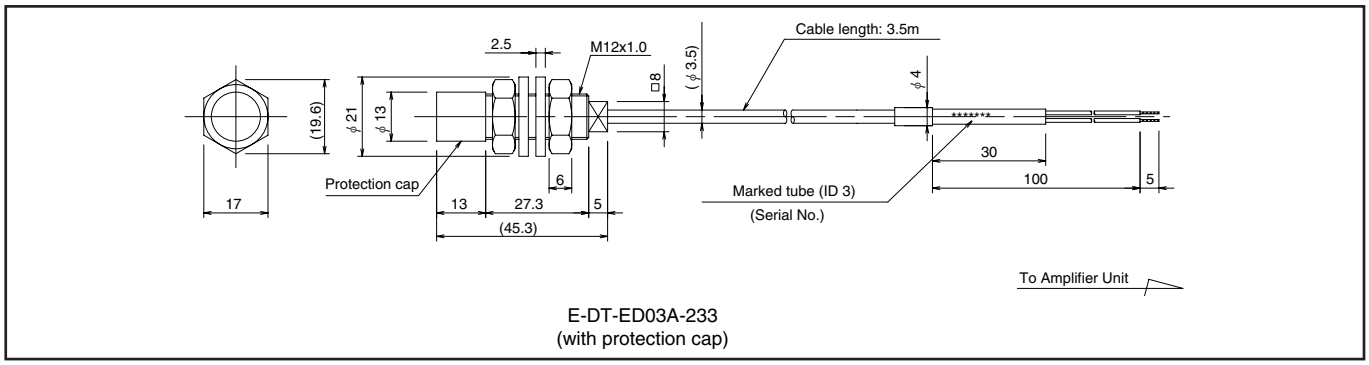
Specifications

Model	**ϕ5 sensor**	AT50316-05C-021
	ϕ10 sensor	AT50316-1035C
Sensor installation limit	**ϕ5 sensor**	1.1 ±0.1mm from tool holder flange surface
	ϕ10 sensor	1.1 ±0.1mm from tool holder flange surface
Measuring range	**ϕ5 sensor**	1.1 ±0.2mm from tool holder flange surface
	ϕ10 sensor	1.1 ±0.2mm from tool holder flange surface
Tool registrations		32 max.
Available tools		BT30, BT40, BT50, HSK63, etc.
Performance	**Display unit**	0.5μm
	Repeatability	3μm or less * Using our master tool holder (BT40)
	Tool rotation speed	120,600 rot/min
	Cycle time	0.3s (rotation speed 600 rot/min, without retries)
Usage environment	**Temperature**	0 to 40°C
	Vibration resistance	3.66 G max. (x, y, z-axis directions)
	Shock resistance	Sensor head: 50G max. (r, z directions, 10 times)
		Amplifier head: 20 G max. (x, y, z directions, 10 times)
	Waterproof standard	IP67 (Sensor Head) *Do not allow water, oil or other liquids to splash amplifier unit.
Power requirements	**Rated voltage**	DC24V±10%
	Rated power	14W
Windows application operating environment and conditions	**Compatible machine**	PC running Windows XP
	RAM	64MB or more
	Disk space	At least 100MB of free disk space is required.
	OS	Windows XP * Windows XP is a trademark of Microsoft Corporation of the United States.
	Interface	One of RS-232C port COM1, COM2, COM3 and COM4 is used.

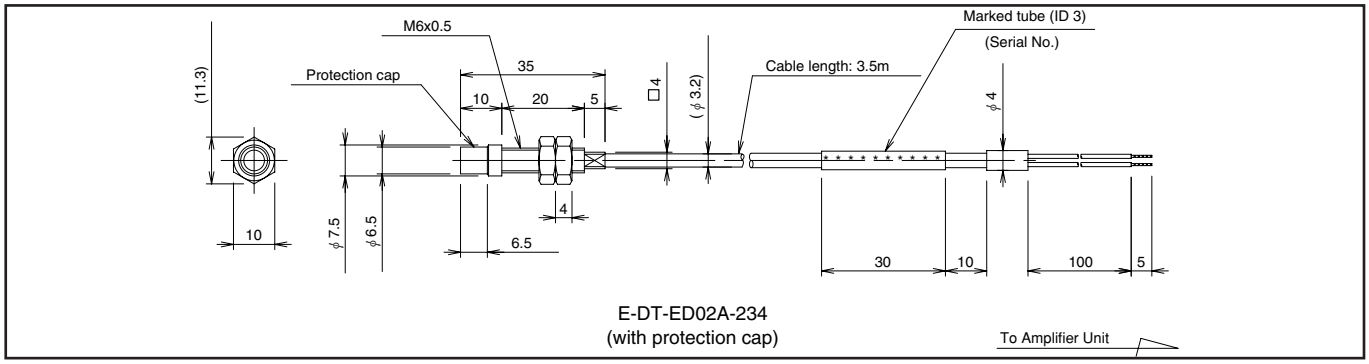
Product Code	Product Name	Model	Qty
4206889	Built-in type ATC run-out detection system ϕ5 sensor	AT50316-05C-011	1
4206890	Built-in type ATC run-out detection system ϕ10 sensor	AT50316-1035C	1
Options			
4206865	I/O cable 15 m	AT50304	———
4206868	Power cable 15 m	AT50305	———
4206870	Casing tube 2.8 m		———
4206876	Sensor connection pressure terminals R 2-3S (100 ea.)		———
4206877	Sensor protection ϕ5 (10 ea.)		———
4206878	Sensor protection caps ϕ10 (10 ea.)		———
4206879	Protection cap gasket		———



〈Installation Precautions〉
1. Allow at least 30mm or space above the device.
2. Allow at least 120mm or space behind the device.
3. Limit the screw-in depth of the mounting screws (M6) to 8mm.
4. Install the device at a location where it will not be splashed with coolant or other liquids.
(recommended protective housing: AM50316-D002)



E-DT-ED03A-233
(with protection cap)



E-DT-ED02A-234
(with protection cap)

■ Sensor Head Installation Precautions

Note 1) Do not cut or add extensions to sensor cables. Be sure to check the sensor draw length before use. Do not touch maked tube ares, but cut within twisted portion.

Note 2) The Sensor Head has passed waterproof structure (standard IP67) and coolant resistance properties tests. This does not, however, mean that resistance to all coolants is guaranteed.

Note 3) A replaceable “protection cap” is attached on the Sensor Head as a measure against wear caused by chips. Do not remove this protection cap during use.

Note 4) Pass the sensor cable through the protective duct to protect it from chips. Ensure a cable bending radius of 35 mm or more.

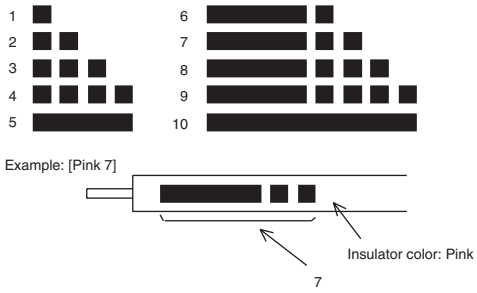
Note 5) The overcurrent sensor controller and overcurrent sensor head set are adjusted before shipment from the factory. Be sure the serial numbers of the amplifier unit and sensor head match before connecting them.

I/O Specifications

I/O signals (PLC interface)

No.	ID	Input	No.	ID	Output
1	Pink 1	Judgment start	14	Yellow 4	Run-out OK
2	Pink 2	Tool registration	15	Yellow 5	Run-out NG
3	Pink 3	Rotation speed notification	16	Yellow 6	No tool
4	Pink 4	Data No. 1	17	Yellow 7	Judgment complete
5	Pink 5	Data No. 2	18	Yellow 8	Ready for measurement
6	Pink 6	Data No. 4	19	Yellow 9	Sensor error
7	Pink 7	Data No. 8	20	Yellow 10	Data mismatch
8	Pink 8	Data No. 16	21	Green 1	Data FULL
9	Pink 9	Data No. 32	22	Green 2	N.C.
10	Pink 10	Data No. 64	23	Green 3	N.C.
11	Yellow 1	Data No. 128	24	Green 4	N.C.
12	Yellow 2	Data No. 256	25	Green 5	Output COM
13	Yellow 3	Input COM			

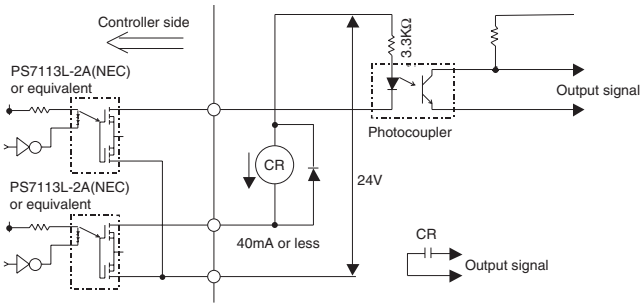
- Make sure to ground the shielded wiring.
- Do not connect any terminals to the empty items.
- Input signals:
  [Refer to the I/O Signal Interface Example.]
  (10 mA or less per signal)
- Output signal: Use at DC 24 V, 40 mA or less.
- Connector (25P, made by JAE)
- Cable
  OD ϕ10.8 interface cable
- ID



I/O Signal Interface Example

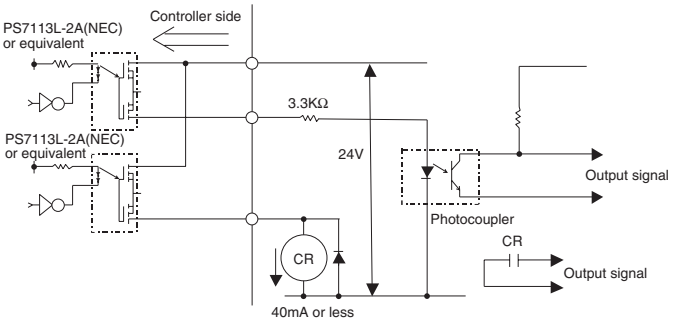
Open drain output

(current sink connection)



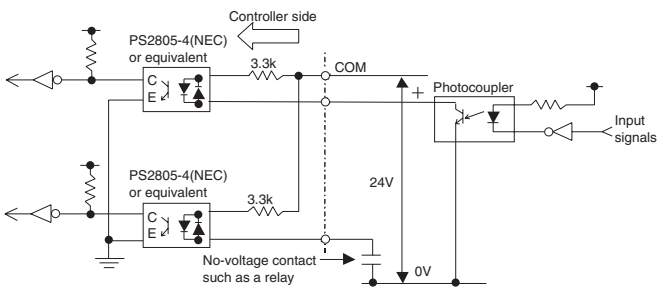
Open drain output

(current source connection)



Photocoupler input

(current sink connection)



Photocoupler input

(current source connection)