

MM20 · 30

Engine Indicator

Overview

The engine indicator records cylinder pressure change in internal-combustion engine, reciprocating steam engines, and air/gas compressor. By monitoring pressure changes in each cylinder, system can assure the operation efficiency and also used for the calculation of horsepower. This economical mechanical indicator is widely utilized for marine internal combustion engines with easy measurement process and high reliability. Besides the one which plots a curve on recording chart paper, a pressure indicator which can easily and quickly measure the maximum output of an engine at the site is also available. The MT pressure indicator indicates the maximum pressure so it can be easily read directly.



M3 type indicator (MM30)



M2 type indicator (MM20)

M2 type indicator (MM20)

Suitable for low speed internal combustion engines, reciprocating steam engines and air/gas compressor. It can be utilized for many applications where the maximum pressure becomes higher.

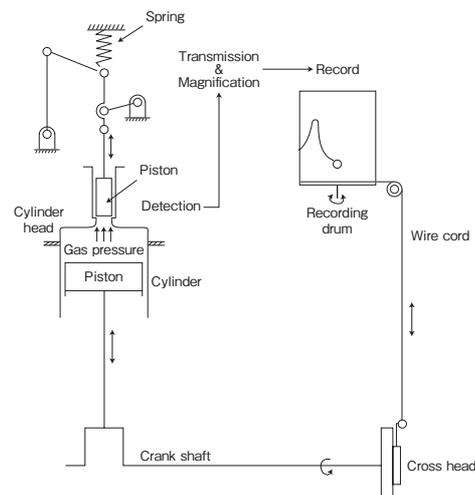
M3 type indicator (MM30)

Suitable for middle speed internal combustion engines, reciprocating steam engines and air/gas compressor. It can be utilized for many applications where the maximum pressure becomes high.

Operating principle

MM20, MM30

Detected pressure changes inside the cylinder by a piston is balanced by a spring at the top through piston rod. A precision link mechanism transmits and magnifies detected displacement and a metal pen with lever tip plots an indicator curve on record chart paper wrapped around a drum. Movement of drum is linked with movement of the engine piston, and is extracted/transmitted by wire cord. The appropriate spring is used depending on its maximum pressure which is easily replaced.



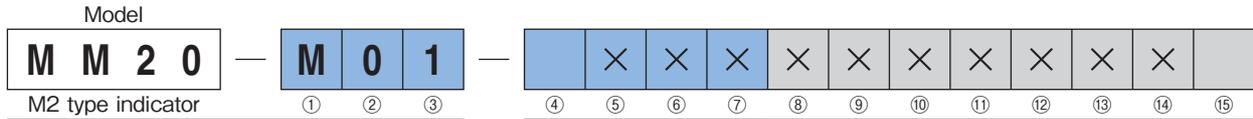
MM20 · 30

Engine Indicator

M2 type indicator

Specification and Model number configuration

Please specify the model number, each specs and the range for ordering.



Model number		Product specifications		Additional specifications (Optional)	
		④ Pressure range (MPa)	2 0 to 10, 12, 14, 16		
			3 0 to 20, 25, 30		
				⑮ Documents	0 Not required
					1 Required (Documents available upon request.) Datasheet (Drawing / Specifications) Instruction manual Inspection procedure Mill test report Calibration test report (One-part one sheet) Inspection / Traceability certificate Attending inspection

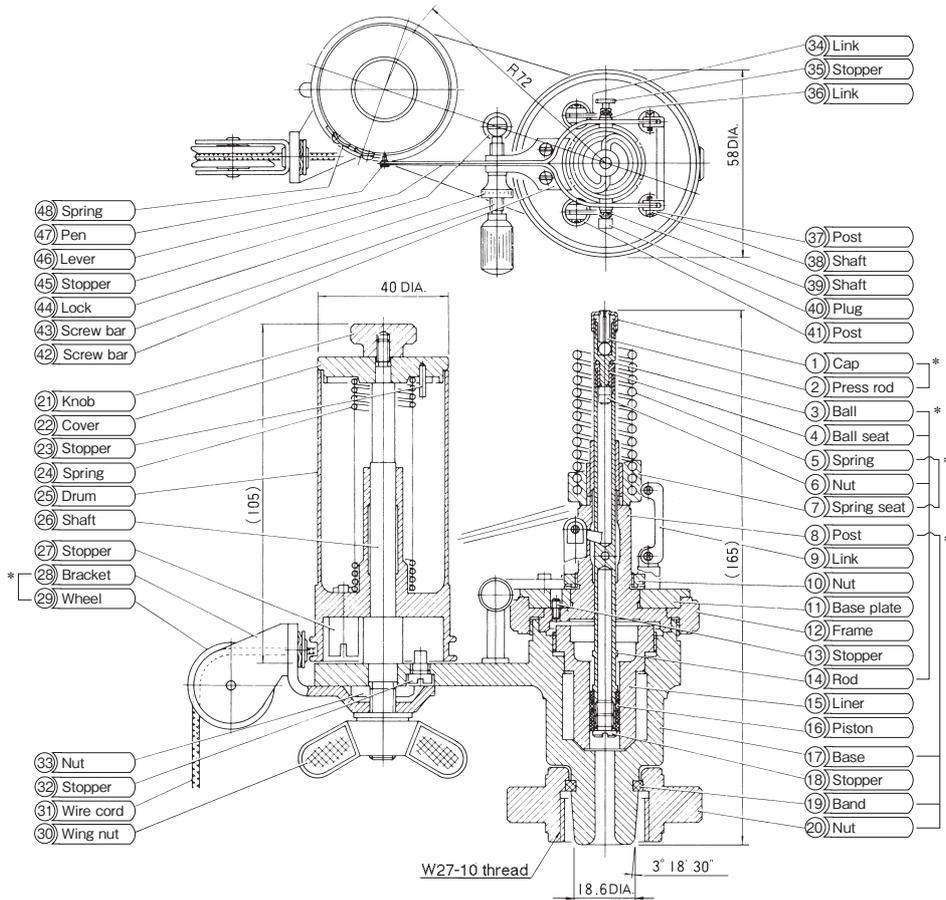
Please specify pressure range and unit of measure along with corresponding ordering code.

Max. pressure MPa	Spring, scale symbol mm/MPa	Piston		Indicator curve		Drum dia. mm
		Size	Diameter mm	Max. height mm	Max. length mm	
2	10	1/10	6.41	50	90	40
	12					
	14					
	16					
3	20	1/20	4.53	50	90	40
	25					
	30					

* Specify code "X" to refer N/A

Design

- Part numbers linked by solid line represent that they are assembled unit sold as one unit.
* indicates the name of assembly.
- Liner ⑮ and piston ⑯ are sold together.
- Size of piston in 1/10 or 1/20 is assembled with rod ⑭ and piston ⑯.



* Contact us when any of listed parts are needed separately. Some of them are partially available.

MM20 · 30

Engine Indicator

M3 type indicator

Specification and Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

M M 3 0 — **M 0 1** — [X] [X]

M3 type indicator ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number Product specifications Additional specifications (Optional)

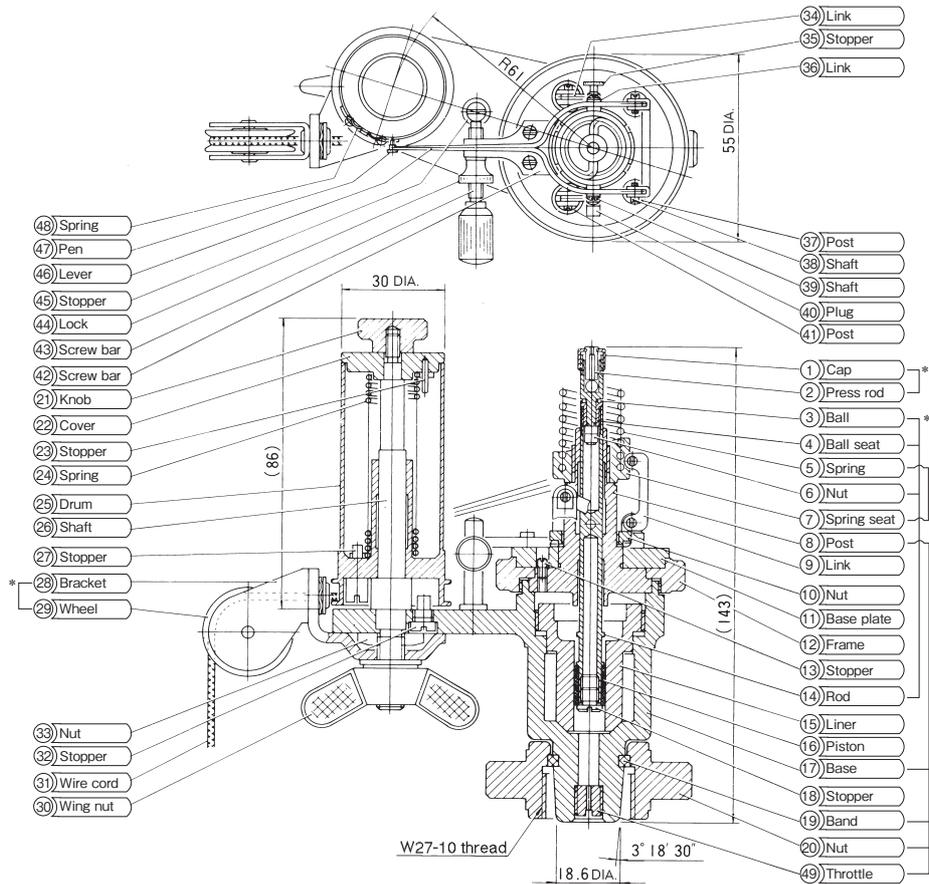
Please specify pressure range and unit of measure along with corresponding ordering code.	④ Pressure range (MPa)	2	0 to 13, 15
		3	0 to 20, 30
	⑮ Documents	0	Not required
		1	Required (Documents available upon request.) Datasheet (Drawing / Specifications) Instruction manual Inspection procedure Calibration test report Mill test report Inspection / Traceability certificate Attending inspection

Max. pressure MPa	Spring, scale symbol mm/MPa	Piston		Indicator curve		Drum dia. mm	
		Size	Diameter mm	Max. height mm	Max. length mm		
2	13	2.55	1/10	6.41	35	60	30
	15	2.04					
3	20	1.53	1/20	4.53	35	60	30
	30	1.02					

* Specify code "X" to refer N/A

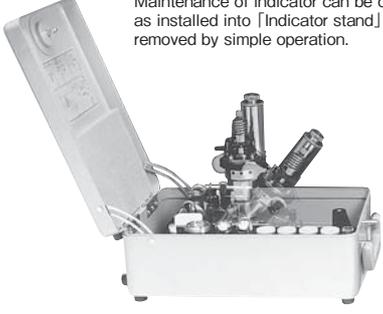
Design

- Part numbers linked by solid line represent that they are assembled unit sold as one unit.
* indicates the name of assembly.
- Liner ⑮ and piston ⑯ are sold together.
- Size of piston in 1/10 or 1/20 is assembled with rod ⑭ and piston ⑯.



* Contact us when any of listed parts are needed separately. Some of them are partially available.

● Accessories for M2/M3 type indicator ●

Item	Part number		M2	M3	Remarks
	Model	Qty.*	MM20-M01	MM30-M01	
Indicator	1		●	●	<ul style="list-style-type: none"> • • • Specified size (Built-in) • • • Specified size • • • Same size as spring • • • Same size as piston with liner <div style="text-align: center; margin-top: 20px;">  <p>Maintenance of indicator can be operated as installed into [Indicator stand] and removed by simple operation.</p> <p>Stored in metal case</p> </div>
Piston with liner	1		●	●	
Spring	2		●	●	
Scale	1		●	●	
Cleaning rod	1		●	●	
Drum spring	1		●	●	
Pen	10		●	●	
Wire cord	2m		●	●	
Recording chart paper	Two pcs. (50 sheets)		●	●	
Hook	1		●	●	
Oil	2		●	●	
Screwdriver	Large	1	●	●	
	Small	1	●	●	
Union nut spanner	1		●	●	
Liner turning tool	1		●	●	
Liner pulling tool	1		●	●	
Cutting pliers	1		●	●	
Pin remover	1		—	—	
Spanner wrench	17 (Head)	1	●	●	
	19 (Head)	1	—	—	
Weight (Approx. kg)	1		5.7	5.4	* No change in quantity is available.

1. Piston with liner and spring other than standard parts are optionally available upon request. In this case, one scale and cleaning bar come with them for each size. If piston with liner and spring size are same as standard, they are not included.

Spring marking

It is necessary to choose appropriate spring corresponding to the pressure of engine. The piston with liner and the scale having the same marking as the spring should be used. This marking indicates the height of the indicator curve in mm. The maximum pressure is expressed in MPa.

For example, a spring marking with: 2.55mm=1MPa 20MPa piston ϕ 4.53

This represents the specification the maximum pressure of 20MPa with built-in spring, 4.53mm (Size 1/20) piston with liner diameter, and height of the indicator curve 2.55mm corresponds to 1MPa pressure. The indicator curve pressure can be read with scale marking: 2.55mm=1MPa.

Piston size and piston

For convenience, piston area 322.7mm² (1/2 in²) is designated as size 1/1. One half of this size is designated 1/2, and one fifth is 1/5.

Piston size	Piston dia. mm
1/1	20.27
4/5	18.23
1/2	14.33
1/5	9.06
1/10	6.41
1/20	4.53

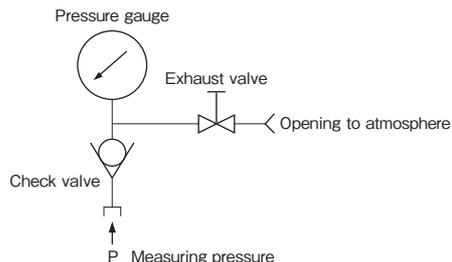
Maximum pressure indicator



Design:

This pressure indicator consists of three elements: Check valve, pressure gauge and exhaust valve. After measured pressure flows into the indicator through the check valve, the check valve doesn't let the pressure go outside. Since the measured pressure keeps flowing in until it reaches the maximum pressure of fixed pressure of the side at which the internal pressure fluctuates. Therefore, the maximum pressure is measured by reading indication when the needle of the pressure gauge becomes steady. After the measurement, the exhaust valve opens and the pressure returns to zero.

Since the indicator uses an oil-filled pressure gauge, it is extremely vibration and heat resistive.



Specification and Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

MT31 — [] [] [] — [X] [X]

Maximum pressure indicator ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number

Product specifications	Additional specifications (Optional)	
⑮ Documents	0	Not required
	1	Required (Documents available upon request.) Datasheet (Drawing / Specifications) Instruction manual Inspection procedure Calibration test report (One-part one sheet) Attending inspection

○ Ensure the cylinder internal flushing and removal of deposit at connection before the installation to keep effective preventing a foreign substance other than gases from entering in.

Model	Pressure indicator				
	Pressure range MPa	Minimum scale MPa	Accuracy	Size	Material
MT31-150	0 to 15	0.5	±1.5%F.S.	60	Bourdon tube SUS316 Socket C3604BD Case SUS304
-200	0 to 20	1			

* Specify code "X" to refer N/A

Dimensions

Unit: mm

