

Automotion produce a wide range of fasteners designed for application where it is important that fasteners are not separated from equipment (e.g. cover panels etc). This is now important to ensure that equipment complies with Machinery Directive 200642/EC - requiring that fasteners remain attached to fixed guards or equipment when guards are removed.






Our captive panel screws are manufactured mainly from stainless steel (A2, AISI 303 grade), but they can also be produced in stainless steel (A4, AISI 316), aluminium, brass or zinc-plated steel.

Many finishes can be applied - black-oxide finish, anodizing etc.

The main options are as follows:

Finish	Notes
Black Chrome (MIL-C-1458B)	Black chrome is a hard, non-reflective coating which is resistant to abrasion, heat and corrosion. The black chrome surface is a dull, dark grey and may be waxed or oiled to darken surface.
Black Oxide Coating (MIL-C-13924B)	Black oxide is a uniform black coating for ferrous metals. Generally it is considered a decorative coating and provides only very limited corrosion protection under mild corrosion conditions.
Cadmium	Cadmium is a bright, silvery white plating. Supplementary treatments for Type II can be golden, iridescent, amber, black or olive drab.
Passivate (QQ-P-35/MIL S-500SC)	Passivation is a process designed to remove foreign metals from the surface of stainless and corrosion resistant steels.
Phosphate Coating Light (TT-C-00490B)	Phosphate coating is a light coating for use as a base paint.
Gold (MIL-G-45204B)	Yellow to orange colour depending on proprietary process used. Will range from matt to bright finish depending on base metal. Good corrosion resistance and high tarnish resistance.
Nickel (QQ-N-290A)	Nickel is a corrosion protective plating for steel, zinc and zinc alloys as well as copper and copper alloys.
Zinc (QQ-Z-325C)	The primary use of chromate finishes on zinc is to retard or prevent formation of white corrosion products on zinc surfaces.

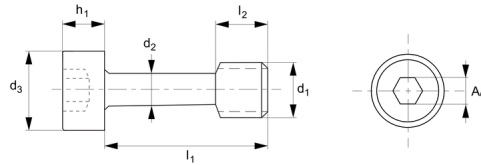
The available head sockets include:

Schematic	Drive Types	Uses
	Hexagonal Recess	Ideal for precision assembly. Most recommended where less surface area is available.
	Crosshead (Phillips [®])	Provides good control in driving. Always use a driver bit of the proper size which is in good condition.
	Star Head (Torx [®])	Positive-engaging, fast-locating method which transmits drive torque with less required downward pressure. Good fastening appearance.
	Slotted	Accepts standard blade screwdriver. Requires less downward pressure to drive parts than those with recessed openings. Use a proper fitting blade to minimize slippage.
	Security	These screws are impossible to remove without the special matching screw driver.

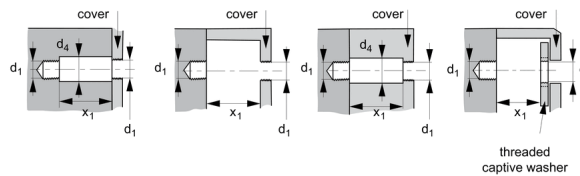


P0154.ZP

CAPTIVE SCREWS



application examples :-
counterbore length 'x₁' should be > l₂



Material

Steel, white zinc-plated.
Tensile strength 550 N/mm².
Also available on request in steel (anodised or black oxide), stainless steel (AISI 316, 1.440 or AISI 303, 1.4305), brass, aluminium etc.

Technical Notes

Used to comply with the Machinery Direc-

tive 2006/42/EC. Generally to ISO 4762.
Often used with our captive washers (P0168) or retaining flanges (P0169.A2 - for sheet metal applications). The use of our captive washers should be considered when fitted in panels with unthreaded holes.

Tips

For TX drive style, see P0156.

Important Notes

Please note that these screws have a reduced diameter shank and should not be tightened to the recommended torque for an equivalent machine screw of size d₁.

Order No.	d ₁	l ₁ ±0.25	d ₂ ±0.12	l ₂ ±0.25	d ₃ max.	d ₄ min.	h ₁ max.	A/F
P0154.025-005-ZP	M 2.5	5	1.8	3.0	4.5	2.8	2.5	2
P0154.025-008-ZP	M 2.5	8	1.8	3.0	4.5	2.8	2.5	2
P0154.025-010-ZP	M 2.5	10	1.8	3.0	4.5	2.8	2.5	2
P0154.025-012-ZP	M 2.5	12	1.8	3.0	4.5	2.8	2.5	2
P0154.030-008-ZP	M 3	8	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-010-ZP	M 3	10	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-012-ZP	M 3	12	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-016-ZP	M 3	16	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-020-ZP	M 3	20	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-025-ZP	M 3	25	2.0	4.5	5.5	3.5	3.0	2.5
P0154.030-030-ZP	M 3	30	2.0	4.5	5.5	3.5	3.0	2.5
P0154.040-010-ZP	M 4	10	2.8	6.0	7.0	4.5	4.0	3
P0154.040-012-ZP	M 4	12	2.8	6.0	7.0	4.5	4.0	3
P0154.040-016-ZP	M 4	16	2.8	6.0	7.0	4.5	4.0	3
P0154.040-020-ZP	M 4	20	2.8	6.0	7.0	4.5	4.0	3
P0154.040-025-ZP	M 4	25	2.8	6.0	7.0	4.5	4.0	3
P0154.040-030-ZP	M 4	30	2.8	6.0	7.0	4.5	4.0	3
P0154.040-035-ZP	M 4	35	2.8	6.0	7.0	4.5	4.0	3
P0154.040-040-ZP	M 4	40	2.8	6.0	7.0	4.5	4.0	3
P0154.040-050-ZP	M 4	50	2.8	6.0	7.0	4.5	4.0	3
P0154.050-012-ZP	M 5	12	3.7	7.5	8.5	5.5	5.0	4
P0154.050-016-ZP	M 5	16	3.7	7.5	8.5	5.5	5.0	4
P0154.050-020-ZP	M 5	20	3.7	7.5	8.5	5.5	5.0	4
P0154.050-025-ZP	M 5	25	3.7	7.5	8.5	5.5	5.0	4
P0154.050-030-ZP	M 5	30	3.7	7.5	8.5	5.5	5.0	4
P0154.050-035-ZP	M 5	35	3.7	7.5	8.5	5.5	5.0	4
P0154.050-040-ZP	M 5	40	3.7	7.5	8.5	5.5	5.0	4
P0154.050-050-ZP	M 5	50	3.7	7.5	8.5	5.5	5.0	4



Captive Screws - Cap Head

hex drive - steel, zinc-plated



Order No.	d ₁	l ₁ ±0.25	d ₂ ±0.12	l ₂ ±0.25	d ₃ max.	d ₄ min.	h ₁ max.	A/F
P0154.060-012-ZP	M 6	12	4.2	7.5	10.0	6.5	6.0	5
P0154.060-016-ZP	M 6	16	4.2	7.5	10.0	6.5	6.0	5
P0154.060-020-ZP	M 6	20	4.2	7.5	10.0	6.5	6.0	5
P0154.060-025-ZP	M 6	25	4.2	7.5	10.0	6.5	6.0	5
P0154.060-030-ZP	M 6	30	4.2	7.5	10.0	6.5	6.0	5
P0154.060-035-ZP	M 6	35	4.2	7.5	10.0	6.5	6.0	5
P0154.060-040-ZP	M 6	40	4.2	7.5	10.0	6.5	6.0	5
P0154.060-050-ZP	M 6	50	4.2	7.5	10.0	6.5	6.0	5
P0154.060-060-ZP	M 6	60	4.2	7.5	10.0	6.5	6.0	5
P0154.060-080-ZP	M 6	80	4.2	7.5	10.0	6.5	6.0	5
P0154.080-016-ZP	M 8	16	6.0	10.0	13.0	8.5	8.0	6
P0154.080-020-ZP	M 8	20	6.0	10.0	13.0	8.5	8.0	6
P0154.080-025-ZP	M 8	25	6.0	10.0	13.0	8.5	8.0	6
P0154.080-030-ZP	M 8	30	6.0	10.0	13.0	8.5	8.0	6
P0154.080-035-ZP	M 8	35	6.0	10.0	13.0	8.5	8.0	6
P0154.080-040-ZP	M 8	40	6.0	10.0	13.0	8.5	8.0	6
P0154.080-045-ZP	M 8	45	6.0	10.0	13.0	8.5	8.0	6
P0154.080-050-ZP	M 8	50	6.0	10.0	13.0	8.5	8.0	6
P0154.080-060-ZP	M 8	60	6.0	10.0	13.0	8.5	8.0	6
P0154.080-080-ZP	M 8	80	6.0	10.0	13.0	8.5	8.0	6
P0154.100-020-ZP	M10	20	7.5	12.5	16.0	10.6	10.0	8
P0154.100-025-ZP	M10	25	7.5	12.5	16.0	10.6	10.0	8
P0154.100-030-ZP	M10	30	7.5	12.5	16.0	10.6	10.0	8
P0154.100-035-ZP	M10	35	7.5	12.5	16.0	10.6	10.0	8
P0154.100-040-ZP	M10	40	7.5	12.5	16.0	10.6	10.0	8
P0154.100-045-ZP	M10	45	7.5	12.5	16.0	10.6	10.0	8
P0154.100-050-ZP	M10	50	7.5	12.5	16.0	10.6	10.0	8
P0154.100-060-ZP	M10	60	7.5	12.5	16.0	10.6	10.0	8
P0154.100-080-ZP	M10	80	7.5	12.5	16.0	10.6	10.0	8
P0154.120-025-ZP	M12	25	8.0	15.0	18.0	13.2	12.0	10
P0154.120-030-ZP	M12	30	8.0	15.0	18.0	13.2	12.0	10
P0154.120-035-ZP	M12	35	8.0	15.0	18.0	13.2	12.0	10
P0154.120-040-ZP	M12	40	8.0	15.0	18.0	13.2	12.0	10
P0154.120-045-ZP	M12	45	8.0	15.0	18.0	13.2	12.0	10
P0154.120-050-ZP	M12	50	8.0	15.0	18.0	13.2	12.0	10
P0154.120-060-ZP	M12	60	8.0	15.0	18.0	13.2	12.0	10
P0154.120-080-ZP	M12	80	8.0	15.0	18.0	13.2	12.0	10
P0154.160-030-ZP	M16	30	12.0	20.0	24.0	17.5	16.0	14
P0154.160-035-ZP	M16	35	12.0	20.0	24.0	17.5	16.0	14
P0154.160-040-ZP	M16	40	12.0	20.0	24.0	17.5	16.0	14
P0154.160-045-ZP	M16	45	12.0	20.0	24.0	17.5	16.0	14
P0154.160-050-ZP	M16	50	12.0	20.0	24.0	17.5	16.0	14
P0154.160-060-ZP	M16	60	12.0	20.0	24.0	17.5	16.0	14
P0154.160-080-ZP	M16	80	12.0	20.0	24.0	17.5	16.0	14
P0154.160-100-ZP	M16	100	12.0	20.0	24.0	17.5	16.0	14
P0154.200-040-ZP	M20	40	16.0	25.0	30.0	22.0	20.0	19
P0154.200-060-ZP	M20	60	16.0	25.0	30.0	22.0	20.0	19
P0154.200-080-ZP	M20	80	16.0	25.0	30.0	22.0	20.0	19
P0154.200-100-ZP	M20	100	16.0	25.0	30.0	22.0	20.0	19
P0154.200-120-ZP	M20	120	16.0	25.0	30.0	22.0	20.0	19

CAPTIVE SCREWS



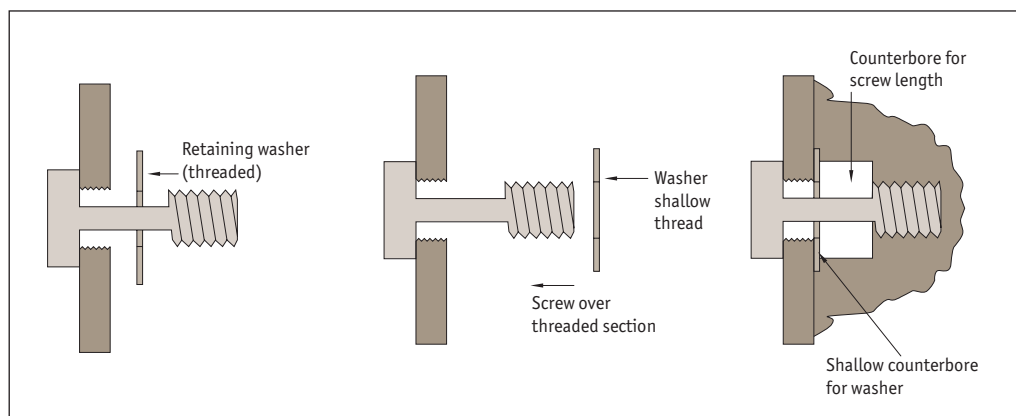
Other options to retain screws to panels are either our retaining washers or our retaining flanges.

Retaining washers

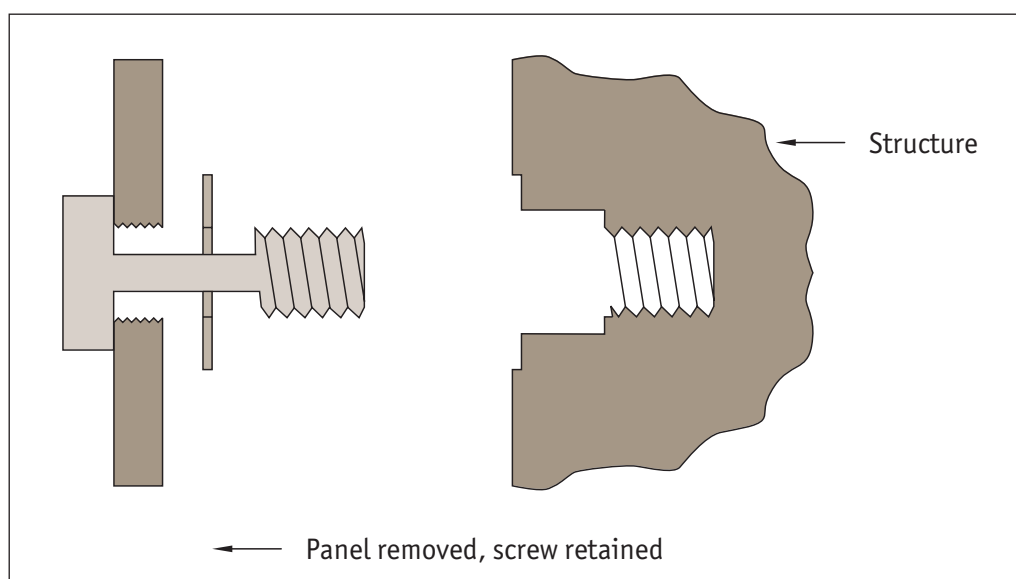
These are simple but effective when used with our captive screws. The captive screws have a normal thread then a reduced diameter for the rest of the screw length.

The washer has a small length of thread on the internal diameter and once screwed on to the captive screw is effectively captive.

Example



Screw the thin retaining washer onto the captive screw and the screw is therefore retained to the panel.





Automation provides a wide range of captive screws to aid customers to comply with the Machinery Directive 2006/42/EC.

In general there is a requirement that fixings for fixed guards shall remain attached to the guard or machinery when the guard is removed. This was implemented mainly to ensure that as far as possible fasteners are not lost when the guard is removed and the guard is therefore re-installed with all required fixings.

A wide range of captive screws and thumb screws are provided...



P0151
Button Head - Hex
Security and Torx Options



P0154
Socket Head - Cap Screw
Security and Torx Options



P0158
Hexagon Head Bolt



P0159
Captive Panel Screw



P0160
Thin Head Thumb Screws



P0161
Thumb Screws

Installation

To work effectively the captive screw when installed needs to have a space or counterbore between the thread and cover at least equal to the length of the thread.

