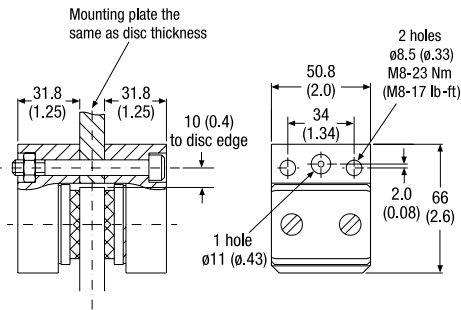


Modular Series

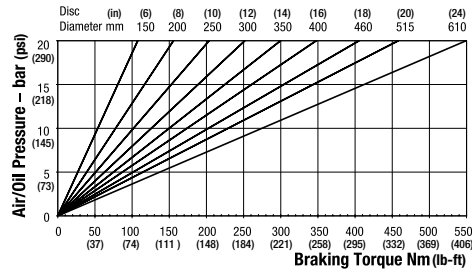
T2 Pneumatically or Hydraulically Applied



The Twiflex T2 disc brake caliper is split caliper design suitable for use with a minimum disc thickness of 5mm (0.20 in). The modules are mounted each side of a central mounting plate of the same thickness as the brake disc. Minimum disc diameter is 120mm (4.72 in). Alternatively, the brake may be side-mounted with a spacer equal to the disc thickness between the two halves.

For pneumatic operation, use dry and filtered compressed air. Pneumatic brakes require a control valve, operated either manually or by pneumatic or electrical signal.

Normally one or two calipers are used per disc, but the



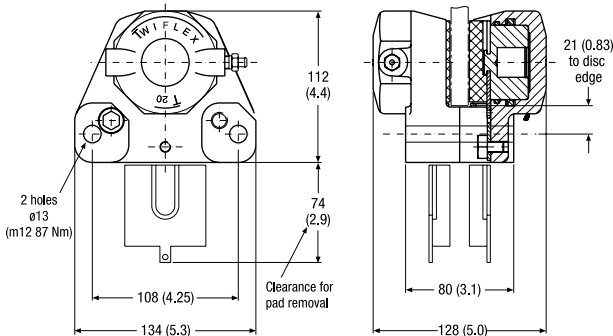
Maximum Pressure 20 bar (290 psi)
 Maximum Braking Force = 2kN @ 20 bar (450 lbf @ 290 psi) oil or air pressure
 Weight of caliper - 0.75kg (1.65 lb)
 Volume displacement per 1mm (0.05 in) stroke at each pad = 3ml (0.10 fl oz)

number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the disc, but should ideally be mounted horizontally (i.e. at the 3 o'clock or 9 o'clock position). A range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

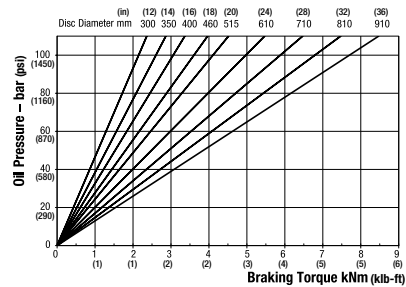
The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) - 0.019m
 (Effective disc radius = actual radius (ft) - 0.06 ft)

T20 Hydraulically Applied



The standard Twiflex T20 disc brake is a side-mounted, split caliper design suitable for use with a minimum disc thickness of 12.7mm (0.50 in). Thicker discs may be accommodated by inserting an appropriate size spacer between the two caliper halves. If the disc thickness is greater than 20mm (0.79 in) the spacer may also be configured as a central mounting plate. Optionally, the caliper may be supplied in a modified form for use with a minimum disc thickness of 8mm (0.31 in). Minimum disc diameter is 300mm (11.81 in).



Maximum Pressure 110 bar (1595 psi)
 Maximum Braking Force = 20kN @ 110 bar (4496 lbf @ 1595 psi)
 Weight of caliper - 5.82kg (12.83 lb)
 Volume displacement per 1mm (0.04 in) stroke at each pad = 4.8ml (0.16 fl oz)

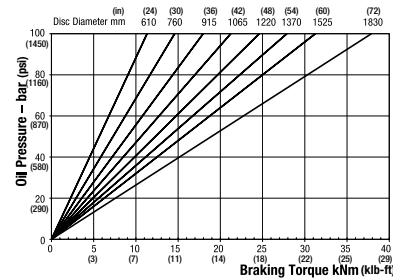
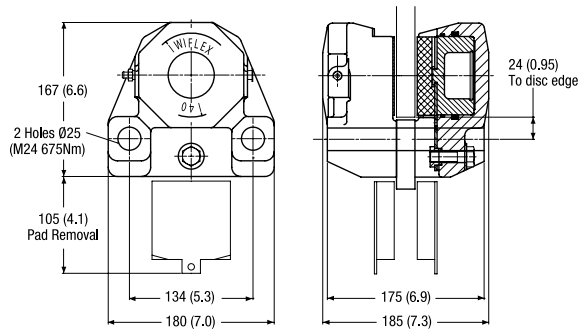
Normally one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the disc. A range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) - 0.032m
 (Effective disc radius = actual radius (ft) - 0.10 ft)

Retraction pressures where shown are calculated and may vary depending on spring tolerance.

T40 Hydraulically Applied



Maximum Pressure 100 bar (1450 psi)
 Maximum Braking Force = 45kN @ 100 bar (10116.40 lbf @ 1450 psi)
 Weight of caliper - 18.6kg (41.08 lb)
 Volume displacement per 1mm (0.04 in) stroke at each pad = 15ml (0.51 fl oz)

The Twiflex T40 disc brake caliper is split caliper design suitable for use with a minimum disc thickness of 20mm (0.79 in). The modules are mounted each side of a central mounting plate of the same thickness as the brake disc. Minimum disc diameter is 300mm (11.81 in).

Normally one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the disc. A

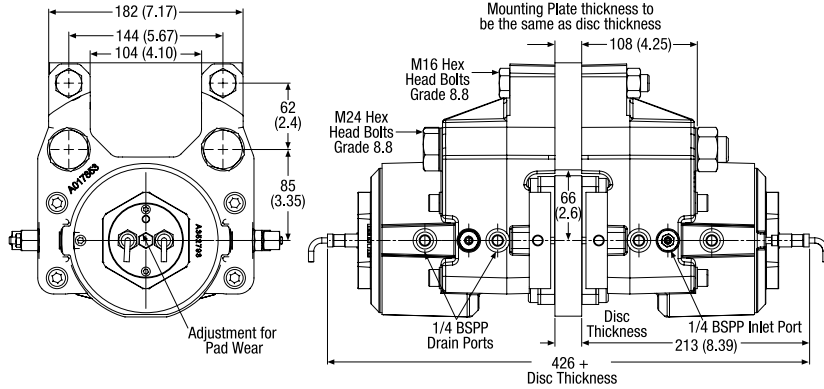
range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.045m
 (Effective disc radius = actual radius (ft) – 0.15 ft)

Modular Series

VCSMk4 Spring Applied – Hydraulically Released



| Caliper Type | Disc/Pad Air Gap mm (in) | Braking Force kN (lb) | Minimum Pressure for Full Retraction bar (psi) |
|--------------|--------------------------|-----------------------|--|
| VCS70 | 1.7 (0.07) | 62 (13938) | 160 (2321) |
| VCS60 | 2.0 (0.08) | 53 (11914) | 148 (2147) |
| VCS50 | 2.0 (0.08) | 44 (9892) | 131 (1900) |
| VCS40 | 2.0 (0.08) | 35 (7868) | 113 (1639) |
| VCS30 | 2.0 (0.08) | 25 (5620) | 94 (1363) |

Weight of caliper (2 modules) - 50kg (110.23 lbs)
Volume displacement per 1mm (0.04 in) stroke at both pads = 21ml (0.71 fl oz)

The Twiflex VCS Mk4 disc brake caliper is comprised of two halves, or spring modules, and is suitable for use with a minimum disc thickness of 20mm (0.79 in). The modules are mounted each side of a central mounting plate of the same thickness as the brake disc. Minimum disc diameter is 500mm (19.69 in).

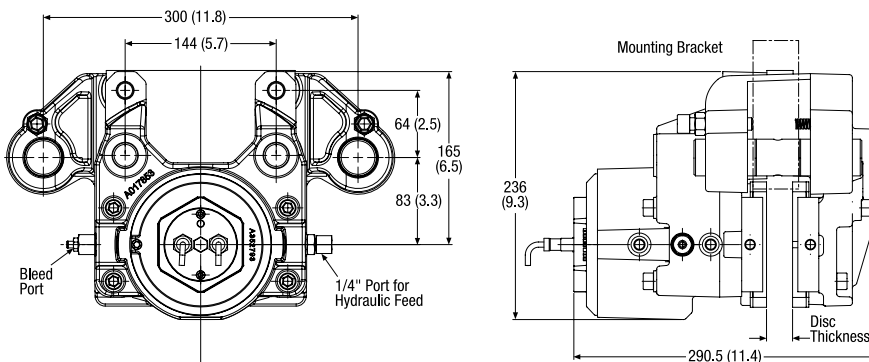
Normally one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the disc, but should ideally be mounted horizontally (i.e. at the 3 o'clock or 9 o'clock position). A range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

Braking force ratings are achieved through a combination of shim number and air gap setting. Spring fatigue life is a function of the caliper rating.

The ratings shown in the table are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.064m
(Effective disc radius = actual radius (ft) – 0.21 ft)

VCS-FL Spring Applied – Hydraulically Released



The Twiflex VCS-FL disc brake caliper comprises a single spring module forming the 'active' side of this floating unit and is available for use where space is limited or to accommodate axial disc float of $\pm 6\text{mm}$ (0.24 in).

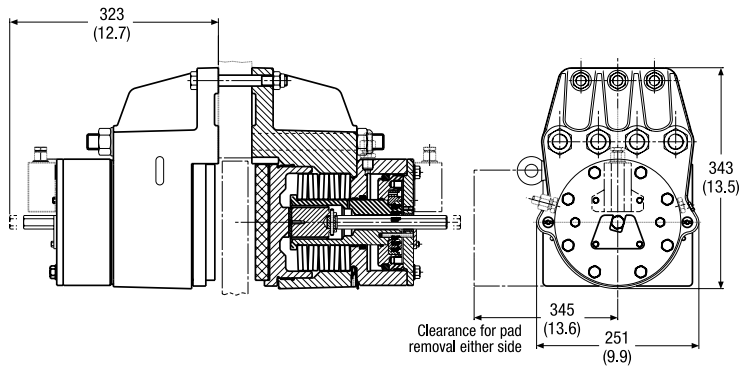
Braking force ratings are achieved through a combination of shim number and air gap setting. Spring fatigue life is a function of the caliper rating.

The ratings shown in the table are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.064m
(Effective disc radius = actual radius (ft) – 0.21 ft)

Retraction pressures where shown are calculated and may vary depending on spring tolerance.

VKSD Spring Applied – Hydraulically Released



The Twiflex VKSD disc brake caliper is comprised of two halves, or spring modules, and is suitable for use with a minimum disc thickness of 20mm (0.79 in). The modules are mounted each side of a central mounting plate 12mm (0.47 in) thicker than the brake disc. Minimum disc diameter is 1000mm (39.37 in).

Normally one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the disc, but should ideally be mounted horizontally (i.e. at the 3 o'clock or 9 o'clock position). A range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

Braking force ratings are achieved through a combination of different springs, shims and air gap settings. Spring fatigue life is a function of the caliper rating.

The ratings shown in the table are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

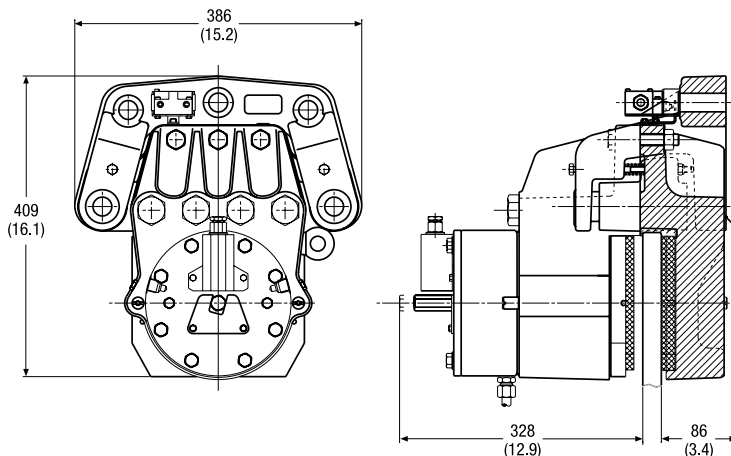
Effective disc radius = actual radius (m) – 0.095m
(Effective disc radius = actual radius (ft) – 0.31 ft)

| Caliper Type | Disc/Pad Air Gap mm (in) | Braking Force kN (lb) | Minimum Pressure for Full Retraction bar (psi) |
|--------------|--------------------------|-----------------------|--|
| VKSD119 | 2 (0.08) | 119 (26752) | 138 (2002) |
| VKSD112 | 2 (0.08) | 112 (25179) | 131 (1900) |
| VKSD104 | 2 (0.08) | 104 (23380) | 124 (1798) |
| VKSD96 | 2 (0.08) | 96 (21582) | 116 (1682) |
| VKSD88 | 2 (0.08) | 88 (19783) | 108 (1566) |
| VKSD80 | 2 (0.08) | 80 (17985) | 100 (1450) |
| VKSD71 | 2 (0.08) | 71 (15961) | 92 (1334) |
| VKSD62 | 2 (0.08) | 62 (13938) | 83 (1204) |
| VKSD58 | 2 (0.08) | 58 (13039) | 63 (914) |
| VKSD53 | 2 (0.08) | 53 (11915) | 58 (814) |
| VKSD47 | 2 (0.08) | 47 (10566) | 53 (769) |
| VKSD41 | 2 (0.08) | 41 (9217) | 47 (682) |
| VKSD34 | 2 (0.08) | 34 (7644) | 41 (595) |
| VKSD28 | 2 (0.08) | 28 (6295) | 34 (493) |

Weight of caliper (2 modules) - 146kg (321.87 lb)

Volume displacement per 1mm (0.04 in) stroke at both pads = 28ml (0.95 fl oz)

VKSD-FL Spring Applied – Hydraulically Released



The Twiflex VKSD-FL disc brake caliper comprises a single spring module forming the 'active' side of this floating unit and is available for use where space is limited or to accommodate axial disc float of $\pm 6\text{mm}$ (0.24 in).

Braking force ratings are achieved through a combination of different springs, shims and air gap settings. Spring fatigue life is a function of the caliper rating.

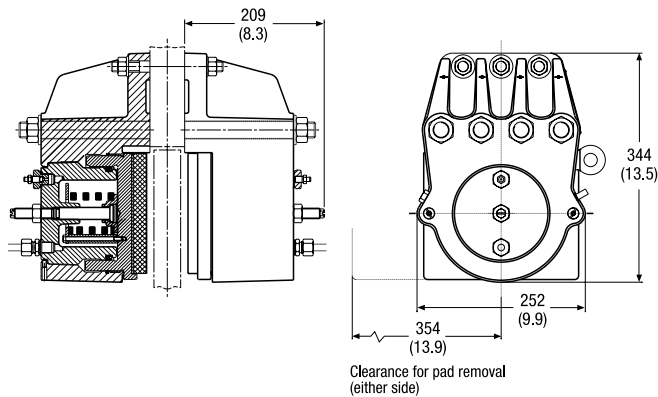
The ratings shown in the table are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.095m
(Effective disc radius = actual radius (ft) – 0.31 ft)

Retraction pressures where shown are calculated and may vary depending on spring tolerance.

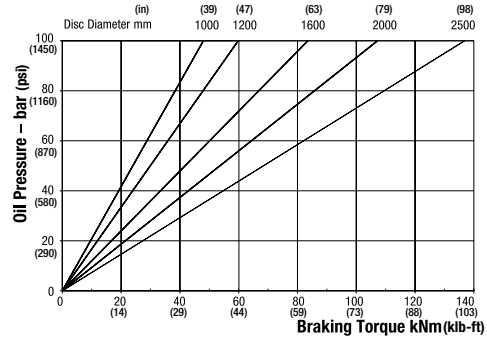
Modular Series

VKHD Hydraulically Applied – Spring Released



The Twiflex VKHD disc brake caliper is comprised of two halves, or hydraulic modules, and is suitable for use with a minimum disc thickness of 20mm (0.79 in). The modules are mounted each side of a central mounting plate 12mm (0.47 in) thicker than the brake disc. Minimum disc diameter is 1000mm (39.37 in).

Normally one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery of the



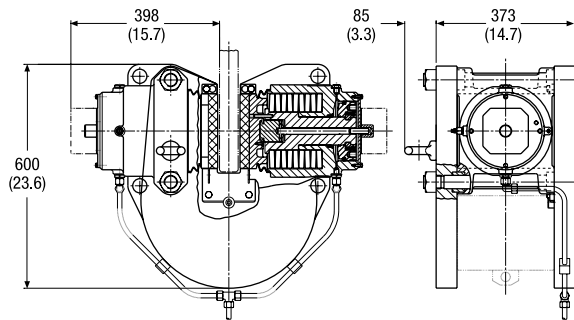
Maximum Pressure 100 bar (1450 psi)
 Maximum Braking Force = 118kN @ 100 bar (26527.46 lbf @1450 psi)
 Weight of caliper (2 modules) - 80kg (176.37 lb)
 Volume displacement per 1mm stroke at both pads = 31ml (1.05 fl oz)

disc, but should ideally be mounted horizontally (i.e. at the 3 o'clock or 9 o'clock position). A range of brake discs is available from Twiflex (see Disc and Hub Assemblies).

The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.095m
 (Effective disc radius = actual radius (ft) – 0.31 ft)

VSMk2 Spring Applied – Hydraulically Released



The Twiflex VS Mk2 disc brake caliper is comprised of two modules secured between U-shaped top and bottom mounting plates by tie rods.

Typically one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery, but ideally mounted horizontally (at the 3 o'clock or 9 o'clock positions).

Minimum disc diameter is 1000mm (39.37 in) with no maximum except for practical limitations. The standard caliper can accommodate disc thicknesses from 38mm (1.49 in) to 50mm (1.97 in) - consult Twiflex for discs thicker than 50mm (1.97 in).

| Caliper Type | Disc/Pad Air Gap mm (in) | Braking Force kN (lb) | Minimum Pressure for Full Retraction bar (psi) |
|--------------|--------------------------|-----------------------|--|
| VS230 | 4 (0.08) | 185 (41590) | 180 (2611) |
| VS205 | 4 (0.08) | 165 (37093) | 163 (2364) |
| VS190 | 4 (0.08) | 153 (34396) | 154 (2234) |
| VS175 | 4 (0.08) | 141 (31698) | 144 (2089) |
| VS155 | 4 (0.08) | 125 (28101) | 131 (1900) |
| VS137 | 4 (0.08) | 111 (24954) | 108 (1566) |
| VS100 | 4 (0.08) | 81 (18210) | 84 (1218) |

Weight of caliper = 410kg (903.89 lb)
 Volume displacement per 1mm (0.04 in) stroke at both pads = 32ml (1.08 fl oz)

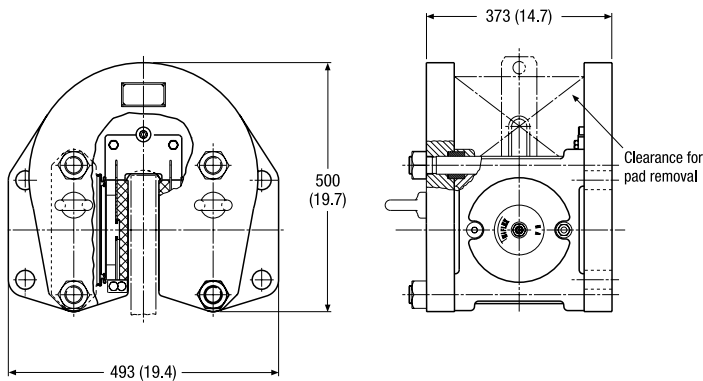
A tandem caliper arrangement is available sharing a common, central, mounting plate; minimum disc diameter is 2000mm (78.74 in).

The ratings shown on the tables are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.110m
 (Effective disc radius = actual radius (ft) – 0.36 ft)

Note: Spring fatigue life is a function of the caliper rating.

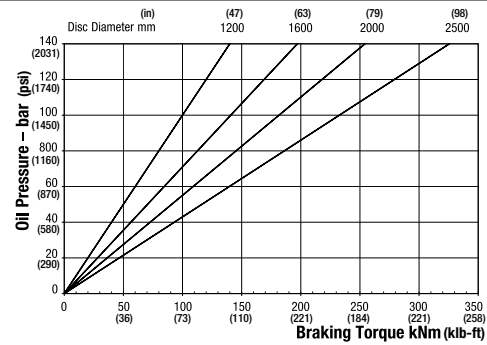
VH Hydraulically Applied – Spring Released



The Twiflex VH disc brake caliper is comprised of two modules secured between U-shaped top and bottom mounting plates by tie rods.

Typically one or two calipers are used per disc, but the number may be increased depending on disc size. The brakes may be positioned at any angle around the periphery, but ideally mounted horizontally (at the 3 o'clock or 9 o'clock positions).

Minimum disc diameter is 1000mm (78.74 in) with no maximum except for practical limitations. The standard caliper can accommodate disc thicknesses from 38mm (1.49 in) to



Maximum Pressure 140 bar (2031 psi)
 Maximum Braking Force = 285kN @ 140 bar (64070.55 lbf @ 2031 psi)
 Weight of caliper - 287kg (632.73 in)
 Volume displacement per 1mm stroke at both pads = 51.7ml (1.75 fl oz)

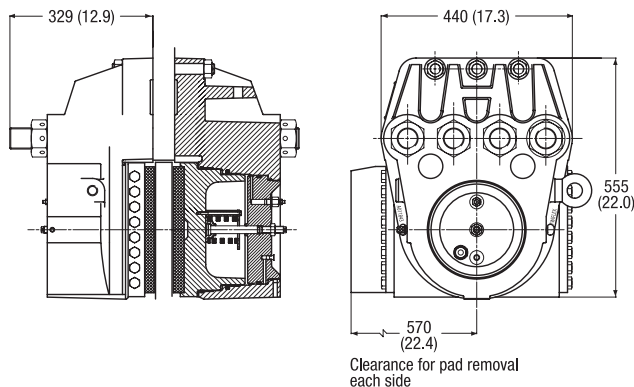
50mm (1.97 in) - consult Twiflex for discs thicker than 50mm (1.97 in).

A tandem caliper arrangement is available sharing a common, central, mounting plate; minimum disc diameter is 2000mm (78.74 in)

The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

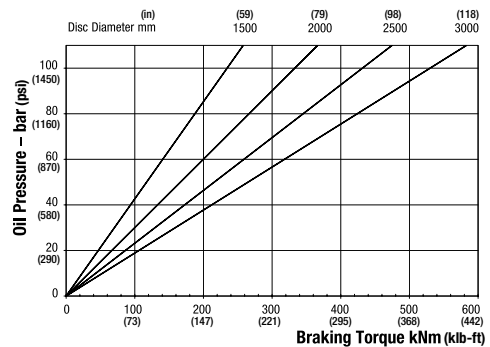
Effective disc radius = actual radius (m) - 0.110m
 (Effective disc radius = actual radius (ft) - 0.36 ft)

VMH2 Hydraulically Applied – Spring Released



The Twiflex VMH2 disc brake caliper is comprised of two modules bolted to a central mounting plate, 12mm (0.47 in) thicker than the brake disc. Minimum disc thickness is 38mm (1.49 in) and minimum disc diameter is 1500mm (59.06 in) with no maximum except for practical limitations.

Typically one or two calipers are used per disc, positioned at any angle around the periphery, but the number may be increased depending on disc size.



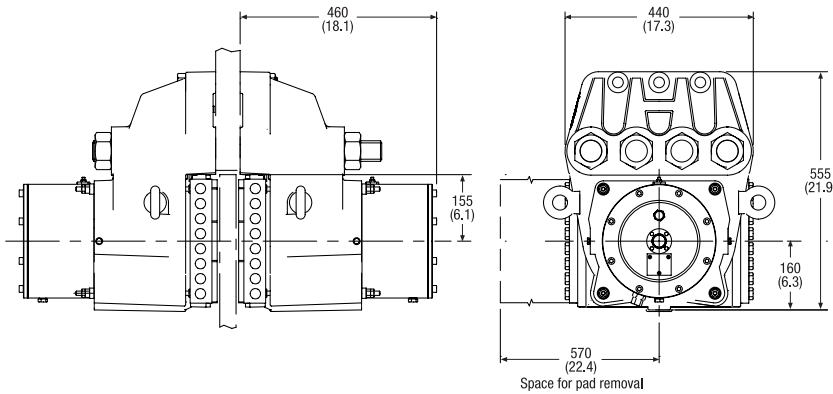
Maximum Pressure 110 bar (1595 psi)
 Maximum Braking Force = 433kN @ 110 bar (97342.27 lbf @ 1595 psi)
 Weight of caliper (2 modules) - 580kg (1278.68 lb)
 Volume displacement per 1mm stroke at both pads = 101.5ml (3.43 fl oz)

The ratings shown on the graph are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) - 0.155m
 (Effective disc radius = actual radius (ft) - 0.38 ft)

Modular Series

VMS3SPS Spring Applied – Hydraulically Released



The Twiflex VMS3-SPS disc brake caliper is comprised of two modules bolted to a central mounting plate, 12mm (0.47 in) thicker than the brake disc. Minimum disc thickness is 38mm (1.49 in) and minimum disc diameter is 1500mm (59.06 in) with no maximum except for practical limitations. Based on a development of the earlier Twiflex VMS2-SP disc brake, the VMS3-SPS provides a significant increase in braking force but in a similarly sized package.

Infinite fatigue life (>2 x 10⁶ cycles) is achievable for most units at the 3mm (0.12 in) air gap shown in the table and possible, by reducing this setting, for the higher rated brakes – contact Twiflex for further information.

The braking force is a function of both the air-gap setting and the thickness of the shim pack (if used) but may be also controlled using hydraulic back pressure during braking.

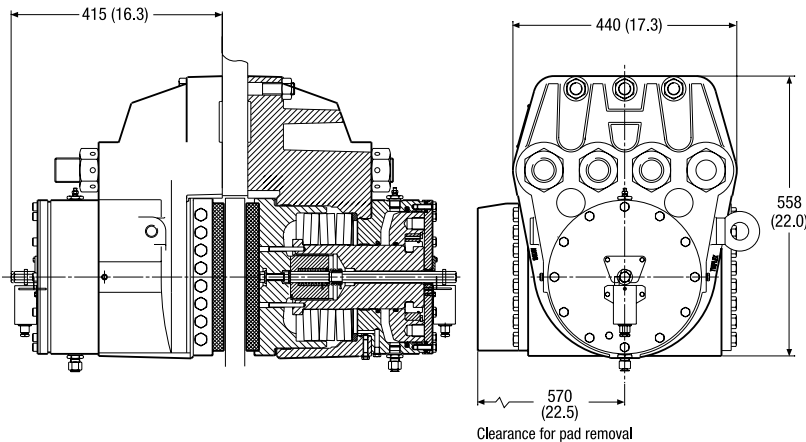
The ratings shown on the tables are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.155m
(Effective disc radius = actual radius (ft) – 0.51 ft)

| Caliper Type | Disc/Pad Air Gap mm (in) | Braking Force kN (lb) | Minimum Pressure for Full Retraction bar (psi) |
|--------------|--------------------------|-----------------------|--|
| VMS3 SPS276 | 3 (0.12) | 276 (62047) | 158 (2292) |
| VMS3 SPS268 | 3 (0.12) | 268 (60249) | 154 (2234) |
| VMS3 SPS260 | 3 (0.12) | 260 (58450) | 149 (2161) |
| VMS3 SPS252 | 3 (0.12) | 252 (56652) | 145 (2103) |
| VMS3 SPS244 | 3 (0.12) | 244 (54853) | 141 (2045) |
| VMS3 SPS236 | 3 (0.12) | 236 (53055) | 137 (1987) |
| VMS3 SPS227 | 3 (0.12) | 227 (51032) | 132 (1914) |
| VMS3 SPS219 | 3 (0.12) | 219 (49233) | 128 (1856) |
| VMS3 SPS211 | 3 (0.12) | 211 (47435) | 124 (1798) |
| VMS3 SPS202 | 3 (0.12) | 202 (45411) | 119 (1726) |
| VMS3 SPS194 | 3 (0.12) | 194 (43613) | 115 (1668) |
| VMS3 SPS185 | 3 (0.12) | 185 (41590) | 110 (1595) |
| VMS3 SPS177 | 3 (0.12) | 177 (39791) | 106 (1537) |
| VMS3 SPS168 | 3 (0.12) | 168 (37768) | 101 (1465) |
| VMS3 SPS159 | 3 (0.12) | 159 (35745) | 96 (1392) |
| VMS3 SPS150 | 3 (0.12) | 150 (33721) | 91 (1320) |
| VMS3 SPS141 | 3 (0.12) | 141 (31698) | 87 (1262) |

Weight of Caliper (2 Modules) = 675kg (1488 lb)
Volume displacement per 1mm (0.04 in) stroke at both pads = 52ml (1.76 fl oz)

VMS2 Spring Applied – Hydraulically Released



The Twiflex VMS2 disc brake caliper is comprised of two modules bolted to a central mounting plate, 12mm (0.47 in) thicker than the brake disc. Minimum disc thickness is 38mm (1.49 in) and minimum disc diameter is 1500mm (59.06 in) with no maximum except for practical limitations.

Typically one or two calipers are used per disc, positioned at any angle around the periphery, but the number may be increased depending on disc size.

The braking force is a function of both the air-gap setting and

the thickness of the shim pack used (see table) but may be also controlled using hydraulic back pressure during braking.

The ratings shown on the tables are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

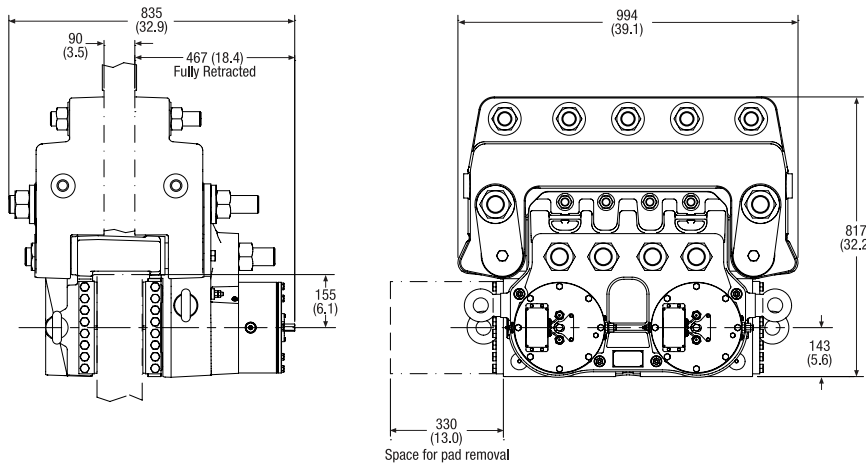
Effective disc radius = actual radius (m) – 0.155m
(Effective disc radius = actual radius (ft) – 0.51 ft)

| Caliper Type | Disc/Pad Air Gap mm (in) | Braking Force kN (lb) | Hydraulic Pressure for Full Retraction bar (psi) |
|--------------|--------------------------|-----------------------|--|
| VMS392 | 3 (0.12) | 392 (88125) | 210 (3046) |
| VMS356 | 3 (0.12) | 356 (80332) | 197 (3857) |
| VMS320 | 3 (0.12) | 320 (71939) | 184 (2669) |
| VMS283 | 3 (0.12) | 283 (63621) | 167 (2422) |
| VMS245 | 3 (0.12) | 245 (55078) | 154 (2234) |
| VMS206 | 3 (0.12) | 206 (46311) | 138 (2002) |
| VMS167 | 3 (0.12) | 167 (37543) | 122 (1769) |

Weight of Caliper (2 Modules) = 670kg (1477 lb)
Volume displacement per 1mm (0.04 in) stroke at both pads = 77ml (2.60 fl oz)

Retraction pressures where shown are calculated and may vary depending on spring tolerance.

VMSDP Spring Applied – Hydraulically Released



| Shim Pack | Braking Force kN (lb) | Minimum Pressure for Full Retraction bar (psi) | Spring Life Cycles |
|-----------|--------------------------|---|-----------------------|
| 0 | 590 (132637) | 169 (2451) | >100000 |
| 1 | 639 (143653) | 181 (2625) | >100000 |
| 2 | 688 (154669) | 192 (2785) | >20000 |
| 3 | 737 (165684) | 204 (2959) | >20000 |

Weight of caliper = 1887Kg (4160 lb)
Volume displacement per 2mm (0.08 in) stroke = 174ml (5.88 fl oz)

Similar to the Twiflex VMS2 disc brake, the VMS-DP comprises 2 spring modules; this time mounted in a common housing to form the 'active' side of a floating brake caliper. This arrangement allows the assembly to accommodate $\pm 10\text{mm}$ (0.39 in) of axial disc movement.

Minimum disc diameter is 4500mm (177.17 in) with no maximum except for practical limitations. Disc thickness for the standard caliper range from 117mm (4.60 in) to 130mm (5.11 in) with the mounting bracket being machined accordingly.

The braking force is a function of both the air-gap setting and the thickness of the shim pack used (see table) but may be also controlled using hydraulic back pressure during braking.

The VMS-DP is primarily intended to function as a holding brake, but may be used for a dynamic duty where spring life is not a consideration (for example, occasional emergency stopping).

The ratings shown in the table are based on fully bedded in and conditioned brake pads with a nominal friction coefficient $\mu = 0.4$. Twiflex disc brakes must be used with Twiflex asbestos free brake pads.

Effective disc radius = actual radius (m) – 0.155m
(Effective disc radius = actual radius (ft) – 0.51 ft)