

# Hydraulic Disc Brakes

## Frenos Hidráulicos de Disco



This catalogue replaces all prior issues which become thus invalid.

The technical data contained in such catalogue refer to those currently used by VULKAN DRIVE TECH.

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|                                                                                                           |           |
|-----------------------------------------------------------------------------------------------------------|-----------|
| <b>Hydraulic Line - Concepts</b> / Línea Hidráulica - Conceptos .....                                     | <b>6</b>  |
| <b>How to Order your Brake</b> / Como Seleccionar su Freno .....                                          | <b>7</b>  |
| <b>Quick Brake Selection</b> / Selección Rápida de los Frenos .....                                       | <b>8</b>  |
| <b>Technical Features</b> / Características Técnicas .....                                                | <b>9</b>  |
| <b>Service Brake 650H - 650EH</b> / Freno de Servicio 650H - 650EH .....                                  | <b>10</b> |
| <b>Service Brake 645H - 645EH</b> / Freno de Servicio 645H - 645EH .....                                  | <b>11</b> |
| <b>Service And Parking Brake 5KEH</b> / Freno de Servicio y Estacionamiento 5KEH .....                    | <b>12</b> |
| <b>Service Brakes 4HE - 3HE</b> / Frenos de Servicio 4HE - 3HE .....                                      | <b>13</b> |
| <b>Service Brakes 4HM - 3HM</b> / Frenos de Servicio 4HM - 3HM .....                                      | <b>14</b> |
| <b>Service Brakes 1HM - 1HMS</b> / Frenos de Servicio 1HM - 1HMS .....                                    | <b>15</b> |
| <b>Service Brakes 3HM - UHF / 1HM - UHF</b> / Frenos de Servicio 3HM - UHF / 1HM - UHF .....              | <b>16</b> |
| <b>Service Brake FHGE77</b> / Freno de Servicio FHGE77 .....                                              | <b>17</b> |
| <b>Emergency Brake EH-08</b> / Freno de Emergencia EH-08 .....                                            | <b>18</b> |
| <b>Emergency Brake EH-12</b> / Freno de Emergencia EH-12 .....                                            | <b>19</b> |
| <b>Emergency Brakes SH-08-1 - SH-08-2</b> / Frenos de Emergencia SH-08-1 - SH-08-2 .....                  | <b>20</b> |
| <b>Emergency Brakes: SH12-E - SH12-1 - SH12-2 - SH12-3</b> / Frenos de Emergencia .....                   | <b>21</b> |
| <b>Emergency Brakes: SH-14-1 - SH-14-2 - SH-14-3</b> / Frenos de Emergencia .....                         | <b>22</b> |
| <b>How to Order your Hydraulic Power Unit</b> / Cómo solicitar sus Unidades Hidráulicas .....             | <b>23</b> |
| <b>Hydraulic Unit: UH - 25L - CH1 - GB - MB2 - V1 - U1 - CX - F1 - PP - S2</b> / Unidad Hidráulica .....  | <b>24</b> |
| <b>Solid Discs - 30 mm Thickness</b> / Discos Sólidos - Espesor 30 mm .....                               | <b>25</b> |
| <b>Solid Discs - 42 mm Thickness</b> / Discos Sólidos - Espesor 42 mm .....                               | <b>26</b> |
| <b>Self-ventilated Discs - 30 mm Thickness</b> / Discos Autoventilados - Espesor 30 mm .....              | <b>27</b> |
| <b>Self-ventilated Discs - 42 mm Thickness</b> / Discos Autoventilados - Espesor 42 mm .....              | <b>28</b> |
| <b>Gear Couplings - RFTB</b> / Acoplamientos de Engranajes - RFTB .....                                   | <b>29</b> |
| <b>Flexible Gear Couplings with Discs - FFTB</b> / Acoplamientos Elásticos con Discos Rectos - FFTB ..... | <b>30</b> |
| <b>Notice</b> / Notas .....                                                                               | <b>31</b> |



# VULKAN'S P

## VULKAN'S POLICY

VULKAN Kupplungs- und Getriebebau and its subsidiaries strive to provide a high quality product in a timely fashion at a competitive price in order to meet the requirements of our customers.

The Organization's environmental policy is to comply with all applicable local, country and national environmental regulations to work towards the prevention of pollution and the improvement of its operations in order to protect our environment.

To accomplish the above goals, every employee of the company and its subsidiaries is committed to implementing and supporting our integrated Quality and Environmental Management System. We believe that through commitment and continuing improvement of our product quality, process and costs our customers will be better served.

### THROUGH COMMITMENT, IMPROVEMENT OF PRODUCT QUALITY AND COSTS OUR CUSTOMER WILL BE BETTER SERVED

In pursuit of improvement, we are measuring our progress through a Quality and Environmental System that meets the requirements of NBR ISO 9001:2000 and complies with ISO 14001:2004 as well as customer- specific requirements.

VULKAN Kupplungs- und Getriebebau is certified to ISO 9001:2000 and this is the minimum requirement for all manufacturing subsidiaries.

Every employee is required to be familiar with and understand all the procedures of the Quality and Environmental Management System relevant to their work. Procedures and requirements are in place to help us improving customer satisfaction, Therefore it is necessary that everyone comply with the procedures and help to improve the system with their suggestions.



# OLICY

## POLÍTICA EMPRESARIAL DE VULKAN

El principal objetivo de la empresa VULKAN Kupplungs- und Getriebebau y de todas sus subsidiarias es poder ofrecer productos de alta calidad a precios competitivos, para así en cualquiera de los casos satisfacer las expectativas de los clientes.

Nuestro sistema de gestión medio ambiental satisface toda normativa legal, tanto a nivel local, como nacional, encaminada a prevenir la contaminación medio ambiental.

Todos nuestros colaboradores de la casa matriz, como de las subsidiarias quedan en aportar su fiel compromiso y soporte encaminado al cumplimiento de nuestro sistema integral de calidad y gestión medio ambiental.

### OPTIMIZACIÓN DE LA CALIDAD DE LOS PRODUCTOS Y DEL NIVEL DE COSTOS EN BENEFICIO DEL CLIENTE

Estamos convencidos que con el cumplimiento de este objetivo y con una continua mejora en la calidad de nuestros productos, en los procesos de producción y en los niveles de costos nuestros clientes serán mejor atendidos.

Los progresos de los continuos procesos de mejora quedan valorados por un sistema de calidad y medio ambiente según las prescripciones de las normativas NBR ISO 9001:2000 y ISO 14001:2004, así como los requisitos específicos del cliente.

A cada colaborador se le exige estar familiarizado con los Sistemas de Calidad y Medio ambientales, para que de esta forma los pueda considerar y respetar al máximo en su quehacer diario. Estas exigencias y procedimientos nos ayudan mejorar la SATISFACCIÓN DEL CLIENTE. Por todo ello es de suma importancia que cada colaborador cumpla con estas exigencias y se involucre activamente para mejorar el sistema.





## Hydraulic Line - Concepts Línea Hidráulica · Conceptos



As Hydraulic Brakes are designed for medium- and high-driving-torque braking systems, they operate under high-pressure conditions. They have a robust construction, however, their small dimensions suit them for operating in small spaces.

### BRAKES CLASSIFICATION:

#### • SERVICE BRAKES:

Spring released and hydraulically applied brakes, they are provided with pads replacement and self-adjusting or non self-adjusting systems.

#### • EMERGENCY BRAKES:

Those are hydraulic pressure-released, spring-applied brakes. Their purpose is to ensure that the equipment stops with total safety regardless of any failure.

### HYDRAULIC CONTROLS:

#### 1.) BY HYDRAULIC POWER UNIT:

VULKAN may provide hydraulic power units with different hydraulic brake control circuits.

i.e.: for fast braking - UH - 25L - CH1

for smooth braking - UH - 25L - CH2

for proportional braking - UH - 60L - CH3

#### 2.) BY HYDRAULIC PEDALS:

Used in Progressive Braking operations, they may be controlled by the operator through pedal and one master cylinder.

A similar drive of automotive vehicles, thus providing total braking torque control.

#### 3.) BY BOOSTER – HYDROPNEUMATIC:

In cases where it is easier to perform control through compressed air, we can provide hydropneumatic control consisting of a booster (pressure intensifier) controlled by pneumatic pedal with total sensibility of braking torque control.

Los Frenos Hidráulicos trabajan con alta presión, una vez que fueron proyectados para sistemas de frenado de medio y alto torque. Son robustos, pero con dimensiones reducidas, adecuándose a aplicaciones con poco espacio.

### CLASIFICACIÓN DE LOS FRENOS:

#### • FRENOS DE SERVICIO:

Son frenos que actúan por acción hidráulica y son liberados por alivio de presión y acción de resortes. Poseen sistemas de sustitución rápida de las pastillas y regulación de desgaste automática o manual.

#### • FRENOS DE EMERGENCIA:

Son frenos que actúan por acción de resortes y son liberados por presión hidráulica. Su finalidad es asegurar la parada del equipamiento con total seguridad, independientemente de cualquier falla.

### COMANDOS HIDRÁULICOS E MISTOS:

#### 1.) POR UNIDADES HIDRÁULICAS:

VULKAN puede suministrar unidades hidráulicas con diferentes tamaños y circuitos hidráulicos de mando de los frenos.

Ej.: para frenados rápidos - U.H. – 25L – CH1

para frenados suavizados - U.H. – 25L – CH2

para frenados proporcionales - U.H. – 60L – CH6

#### 2.) POR PEDALES HIDRÁULICOS:

Utilizados en Frenados Progresivos pudiendo ser controlados por el operador mediante pedal y cilindro maestro, accionamiento hecho de forma semejante al de los vehículos automotores, proporcionando total control del par de frenado.

#### 3.) POR BOOSTER - HIDRONEUMÁTICO:

Para casos en que haya mayor facilidad en efectuar el control por medio de aire comprimido es posible adoptar un mando mixto, constituido básicamente de un booster (intensificador de presión) controlado por pedal neumático accionado por el operador.

## How to Order your Brake

### Como Seleccionar su Freno



Example: / Ejemplo: **FHD-SH12-1-RM-42-0-SP-CP-00-PP-PO**

Example:  
Ejemplo:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------|
| <b>FEHSD1 – Electrohydraulic Shoe Brake (according to DIN 15435 standard)</b><br>FEHSD1 – Freno Electrohidráulico de Zapata (según DIN 15435 standard)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ← | <b>FED1</b>   |
| <b>Brake Model / Modelo del Freno</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ← | <b>SH12-1</b> |
| <b>RA – Automatic lining wear compensation – Desgaste de compensador automatico</b><br><b>RM – Manual lining wear compensation – Desgaste de compensador manual</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ← | <b>RM</b>     |
| <b>Disc thickness / Espesor del Disco</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ← | <b>42</b>     |
| <b>D – Right hand assembly / D – Lado de montaje del actuador derecho</b><br><b>E – Left hand thruster assembly / E – Lado de montaje del actuador izquierdo</b><br><b>O – Centralized assembly (standard) / O – Actuador centralizado</b>                                                                                                                                                                                                                                                                                                                                                                                        | ← | <b>0</b>      |
| <b>SP – Standard on-off sensor detection / SP – Detección de sensor de apertura y cierre Estándar</b><br><b>SE – Especial sensor detection / SE – Detección de sensor Especial</b><br><b>00 – No sensor / 00 – Sin sensor</b>                                                                                                                                                                                                                                                                                                                                                                                                     | ← | <b>SP</b>     |
| <b>CP – Standard worn out linings control and detection (CDPG)</b><br>CP – Control y Detección de las guarniciones gastada, Estándar (CDPG)<br><b>CE – Especial worn out linings control and detection (CDPG)</b><br>CE – Control y Detección de las Guarniciones Gastada, Especial (CDPG)<br><b>00 – No CDPG / 00 – Sin controle de detección de las guarniciones gastadas (CDPG)</b>                                                                                                                                                                                                                                            | ← | <b>CP</b>     |
| <b>DA – Hand release lever / DA – Palanca de embrague manual</b><br><b>00 – No unblock / 00 – Sin desbloqueo</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ← | <b>00</b>     |
| <b>PP – Standard painting (yellow 10YR 8/14) / PP – Pintura estándar (amarillo 10YR 8/14)</b><br><b>PE – Especial painting / PE – Pintura especial</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ← | <b>PP</b>     |
| <b>P0 – Organic, non-asbestos brake lining</b><br>P0 – Guarnición de freno sin asbesto, Orgánico<br><b>PS1 – Organic, non-asbestos brake lining with worn out flexible</b><br>PS1 – Guarnición de freno sin asbesto orgánico con flexible<br><b>PS2 – Sintered brake lining</b><br>PS2 – Guarnición de freno sinterizada<br><b>PS3 – Sintered brake lining with worn out flexible</b><br>PS3 – Guarnición de freno Sinterizada con flexible<br><b>PS4 – Special brake lining</b><br>PS4 – Guarnición de freno Especial<br><b>PS5 – Brake lining without metallic particle</b><br>PS5 – Guarnición de freno sin partícula metálica | ← | <b>P0</b>     |

## Quick Brake Selection

### Selección Rápida de los Frenos

VULKAN hydraulic brakes are divided into six product lines:

- **“H”** and **“HM”** lines:  
Service brakes with mechanical pads adjustment:  
**(H)** normally opened; **(HM)** normally closed.
- **“600”** and **“K”** lines:  
Service brakes with mechanical pads adjustment and self-adjustment pads, normally closed.
- **“EH”** line:  
Emergency brakes with mechanical pads adjustment normally opened.
- **“SH”** line:  
Emergency brakes with mechanical pads adjustment normally closed.

These product lines are subdivided into several models, construction shapes and drive types, as shown in the table below:

Los frenos hidráulicos VULKAN se dividen en seis líneas de productos:

- Líneas **“H”** y **“HM”**:  
Frenos de servicio con recuperación manual de desgaste de las guarniciones  
– **(H)**: normalmente abierto. **(HM)**: normalmente cerrado.
  - Línea **“600”** y **“K”**:  
Frenos de servicio con recuperación manual y automática de desgaste de las guarniciones, normalmente cerrado
  - Línea **“EH”**:  
Frenos de emergencia con recuperación manual de desgaste de las guarniciones, normalmente abiertos.
  - Línea **“SH”**:  
Frenos de emergencia con recuperación manual de desgaste de las guarniciones, normalmente cerrados.
- Estas líneas se subdividen en varios modelos, formas constructivas y tipos de actuaciones, según las tablas siguientes:

TABLE I – Brake Selection / TABLA I – Selección de los Frenos

| Discs/Discos<br>Brakes/Frenos |              | Brake disc diameter [mm] vs. Braking torque [Nm] / Diámetros de los discos de freno [mm] x Par de frenado [Nm] |       |       |       |       |       |       |       |        |        |        |        |        |
|-------------------------------|--------------|----------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
|                               |              | 175                                                                                                            | 220   | 260   | 315   | 355   | 395   | 445   | 495   | 550    | 625    | 705    | 795    | 995    |
| Service<br>Servicio           | 650H / 650EH | 110                                                                                                            | 130   | 150   | 190   | 220   | 260   | 300   | 350   | 390    | 460    | -      | -      | -      |
|                               | 645H / 645EH | -                                                                                                              | -     | -     | 380   | 440   | 520   | 600   | 700   | 780    | 920    | -      | -      | -      |
|                               | 5KH          | -                                                                                                              | -     | -     | 190   | 220   | 260   | 300   | 350   | 390    | 460    | -      | -      | -      |
|                               | 4HE          | -                                                                                                              | -     | -     | -     | -     | -     | 1.150 | 1.300 | 1.500  | 1.800  | 2.100  | 2.400  | -      |
|                               | 3HE          | -                                                                                                              | -     | -     | -     | -     | -     | 1.800 | 2.070 | 2.370  | 2.770  | 3.200  | 3.690  | -      |
|                               | 4HM          | -                                                                                                              | -     | -     | -     | -     | -     | 1.150 | 1.300 | 1.500  | 1.800  | 2.100  | 2.400  | -      |
|                               | 3HM          | -                                                                                                              | -     | -     | -     | -     | -     | 1.800 | 2.070 | 2.370  | 2.770  | 3.200  | 3.690  | -      |
|                               | 1HM          | -                                                                                                              | -     | -     | -     | -     | -     | -     | -     | 4.320  | 5.050  | 5.840  | 6.720  | 8.680  |
|                               | 1HMS         | -                                                                                                              | -     | -     | -     | -     | -     | -     | -     | 6.700  | 7.870  | 9.120  | 10.520 | 13.635 |
|                               | FHGE 77      | -                                                                                                              | -     | -     | 5.101 | 6.050 | 6.999 | 8.186 | 9.372 | 10.677 | 12.456 | 14.355 | 16.490 | 21.235 |
| Max. n (1) [rpm]              |              | 5.000                                                                                                          | 4.300 | 3.600 | 3.000 | 2.700 | 2.400 | 2.100 | 1.900 | 1.800  | 1.500  | 1.300  | 1.200  | 900    |

| Discs/Discos<br>Brakes/Frenos |         | Brake disc diameter [mm] vs. Braking torque [Nm] / Diámetros de los discos de freno [mm] x Par de frenado [Nm] |        |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------------|---------|----------------------------------------------------------------------------------------------------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                               |         | 800                                                                                                            | 900    | 1.000   | 1.100   | 1.200   | 1.300   | 1.400   | 1.500   | 1.600   | 1.700   | 1.800   | 1.900   | 2.000   |
| Emergency<br>Emergencia       | EH-08   | 11.904                                                                                                         | 13.824 | 15.744  | 17.664  | 19.584  | 21.504  | 23.424  | 25.344  | 27.264  | 29.184  | 31.104  | 33.024  | 34.944  |
|                               | EH-12   | 18.600                                                                                                         | 21.600 | 24.600  | 27.600  | 30.600  | 33.600  | 36.600  | 39.600  | 42.600  | 45.600  | 48.600  | 51.600  | 54.600  |
|                               | SH-08-1 | 7.004                                                                                                          | 8.034  | 9.064   | 10.094  | 11.125  | 12.155  | 13.185  | 14.215  | 15.245  | 16.275  | 17.305  | 18.335  | 19.365  |
|                               | SH-08-2 | 3.502                                                                                                          | 4.017  | 4.532   | 5.047   | 5.562   | 6.077   | 6.592   | 7.107   | 7.622   | 8.137   | 8.652   | 9.167   | 9.682   |
|                               | SH-12-E | 45.130                                                                                                         | 52.409 | 59.688  | 66.967  | 74.246  | 81.525  | 88.804  | 96.083  | 103.362 | 110.641 | 117.920 | 125.199 | 132.478 |
|                               | SH-12-1 | 32.996                                                                                                         | 38.318 | 43.640  | 48.962  | 54.284  | 59.606  | 64.927  | 70.249  | 75.571  | 80.893  | 86.215  | 91.537  | 96.859  |
|                               | SH-12-2 | 19.159                                                                                                         | 22.249 | 25.339  | 28.429  | 31.520  | 34.610  | 37.700  | 40.790  | 43.880  | 46.970  | 50.060  | 53.151  | 56.241  |
|                               | SH-12-3 | 12.773                                                                                                         | 14.833 | 16.893  | 18.953  | 21.013  | 23.073  | 25.133  | 27.193  | 29.253  | 31.314  | 33.374  | 35.434  | 37.494  |
|                               | SH-14-1 | 79.657                                                                                                         | 93.391 | 107.125 | 120.859 | 134.593 | 148.327 | 162.061 | 175.795 | 189.529 | 203.263 | 216.997 | 230.731 | 244.465 |
|                               | SH-14-2 | 69.7                                                                                                           | 81.717 | 93.735  | 105.752 | 117.769 | 129.786 | 141.804 | 153.821 | 165.838 | 177.855 | 189.873 | 201.890 | 213.907 |
| SH-14-3                       | 55.76   | 65.374                                                                                                         | 74.988 | 84.601  | 94.215  | 103.829 | 113.443 | 123.057 | 132.670 | 142.284 | 151.898 | 161.512 | 171.126 |         |
| Max. n (1) [rpm]              |         | 1.200                                                                                                          | 1.100  | 900     | 800     | 700     | 600     | 550     | 480     | 450     | 410     | 380     | 350     | 320     |

(1) Maximum disc speed / (1) Rotación máxima del disco



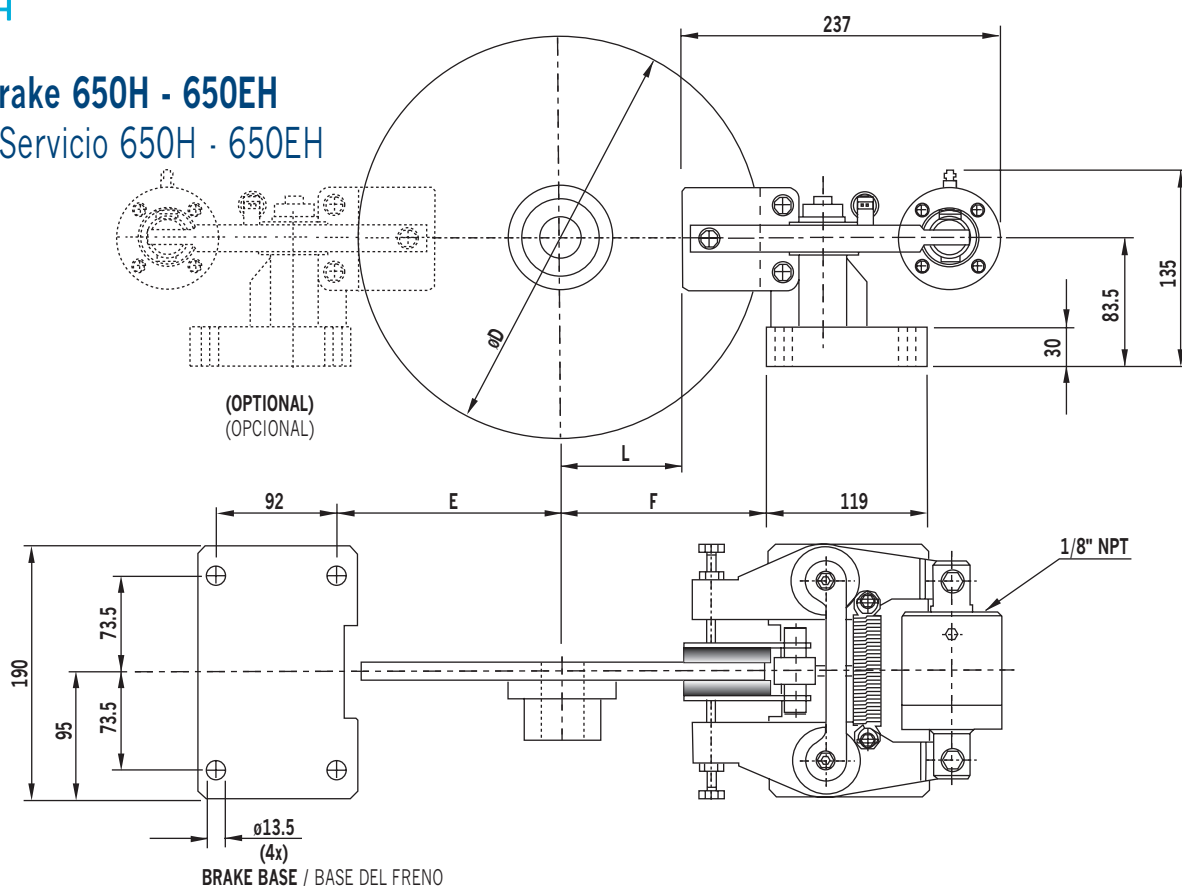
## Technical Features

### Características Técnicas

| Table II – Service and Emergency Brakes - Technical Features /<br>Tabla II - Frenos de Servicio y Emergencia - Características Técnicas |                                      |                             |                                               |                                                 |                                           |                                                 |                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------|-----------------------------------------------|-------------------------------------------------|-------------------------------------------|-------------------------------------------------|-----------------------------------------------|
|                                                                                                                                         | Brake Model<br>Modelos de los Frenos | Weight [kgf]<br>Pesos [kgf] | Disc Thickness [mm]<br>Espesor del Disco [mm] | Appling<br>Actuación                            | Torque Adjustment<br>Regulación de Torque | Releasing<br>Liberación                         | Worn-out Adjustment<br>Regulación de Desgaste |
| Service / Servicio                                                                                                                      | 650H                                 | 35                          | 15 or 30<br>15 ó 30                           | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
|                                                                                                                                         | 650EH                                | 35                          | 15 or 30<br>15 ó 30                           | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | 645H                                 | 40                          | 30                                            | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
|                                                                                                                                         | 645EH                                | 40                          | 30                                            | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | 5KH                                  | 45                          | 30                                            | hydraulic / spring<br>por resortes / hidráulica | 0% to - 100%<br>0% al - 100%              | hydraulic / spring<br>por resortes / hidráulica | self-adjusting (automatic)<br>automática      |
|                                                                                                                                         | 4HE / 3HE                            | 65 / 125                    | 30                                            | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
|                                                                                                                                         | 4HM / 3HM                            | 80 / 140                    | 30                                            | spring<br>por resortes                          | - 30% to + 20%<br>- 30% al + 20%          | hydraulic<br>hidráulica                         | self-adjusting (automatic)<br>automática      |
|                                                                                                                                         | 1HM / 1HMS                           | 200 / 250                   | 42                                            | spring<br>por resortes                          | - 30% to + 20%<br>- 30% al + 20%          | hydraulic<br>hidráulica                         | self-adjusting (automatic)<br>automática      |
|                                                                                                                                         | FHGE 77                              | 57                          | as per application<br>según aplicación        | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
| Emergency / Emergencia                                                                                                                  | EH-08                                | 120                         | as per application<br>según aplicación        | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
|                                                                                                                                         | EH-12                                | 240                         | as per application<br>según aplicación        | hydraulic<br>hidráulica                         | 0% to - 100%<br>0% al - 100%              | spring<br>por resortes                          | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-08-1                              | 120                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-08-2                              | 120                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-12-E                              | 240                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-12-1                              | 240                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-12-2                              | 240                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-12-3                              | 240                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-14-1                              | 370                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-14-2                              | 370                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |
|                                                                                                                                         | SH-14-3                              | 370                         | as per application<br>según aplicación        | spring<br>por resortes                          | no adjustment<br>sin regulación           | hydraulic<br>hidráulica                         | mechanical (manual)<br>manual                 |

## Service Brake 650H - 650EH

### Freno de Servicio 650H - 650EH



BRAKE BASE / BASE DEL FRENO

|                                                           |                                           |                                                                               |                                     |
|-----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso - 650H</b>                               | <b>35 [kgf]</b>                           | <b>Pads worn-out adjustment</b><br>Regulación de desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Applying / Frenado:</b>                                | <b>Progressive hydraulic / Hidráulica</b> | <b>Disc Thickness / Espesor del Disco</b>                                     | <b>15 or 30 [mm] / 15 ó 30 [mm]</b> |
| <b>Releasing / Desfrenado:</b>                            | <b>Spring / Por Resortes</b>              | <b>Pads Area</b><br>Área de las guarniciones                                  | <b>190 [cm²]</b>                    |
| <b>Maximum work pressure</b><br>Presión máxima de trabajo | <b>3 [bar]</b>                            | <b>Maximum work pressure</b><br>Presión máxima de trabajo                     | <b>30 [bar]</b>                     |

|                                                           |                                           |                                                                             |                                     |
|-----------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso - 650EH</b>                              | <b>35 [kgf]</b>                           | <b>Pads worn-out adjustment</b><br>Regulación del desgaste de las pastillas | <b>Mechanical - Manual / Manual</b> |
| <b>Applying / Frenado:</b>                                | <b>Spring / Por Resortes</b>              | <b>Disc Thickness / Espesor del Disco</b>                                   | <b>15 or 30 [mm] / 15 ó 30 [mm]</b> |
| <b>Releasing / Desfrenado:</b>                            | <b>Progressive hydraulic / Hidráulica</b> | <b>Pads Area</b><br>Área de las guarniciones                                | <b>190 [cm²]</b>                    |
| <b>Maximum work pressure</b><br>Presión máxima de trabajo | <b>30 [bar]</b>                           | <b>Maximum work pressure</b><br>Presión máxima de trabajo                   | <b>40 [bar]</b>                     |

| Discs [mm]<br>Discos [mm] | Dimensions [mm]<br>Dimensiones [mm] |     |     | Inertia (1) [kgm²]<br>Inercias (1) [kgm²] | Weight (1) [kgf]<br>Peso (1) [kgf] | Braking Torque [Nm]<br>Par de Frenado [Nm] | Braking Force [N]<br>Fuerza de Frenado [N] |
|---------------------------|-------------------------------------|-----|-----|-------------------------------------------|------------------------------------|--------------------------------------------|--------------------------------------------|
| ØD                        | E                                   | F   | L   | J                                         | P                                  | TF                                         | EF                                         |
| 175                       | 118                                 | 106 | 43  | 0,01                                      | 4                                  | 0 to 110                                   | 0 to 1.600                                 |
| 220                       | 128                                 | 116 | 53  | 0,03                                      | 8                                  | 0 to 130                                   |                                            |
| 260                       | 143                                 | 131 | 68  | 0,07                                      | 13                                 | 0 to 150                                   |                                            |
| 315                       | 173                                 | 161 | 98  | 0,14                                      | 18                                 | 0 to 190                                   |                                            |
| 355                       | 193                                 | 181 | 118 | 0,22                                      | 21                                 | 0 to 220                                   |                                            |
| 395                       | 213                                 | 201 | 138 | 0,33                                      | 24                                 | 0 to 260                                   |                                            |
| 445                       | 238                                 | 226 | 163 | 0,61                                      | 36                                 | 0 to 300                                   |                                            |
| 495                       | 263                                 | 251 | 188 | 0,96                                      | 51                                 | 0 to 350                                   |                                            |
| 550                       | 293                                 | 281 | 218 | 1,45                                      | 60                                 | 0 to 390                                   |                                            |
| 625                       | 328                                 | 316 | 253 | 2,49                                      | 75                                 | 0 to 460                                   |                                            |

(1) Inertia and weight values according to 15 mm thickness solid discs. / (1) Inercias y pesos relativos a los discos sólidos 15 mm de espesor.

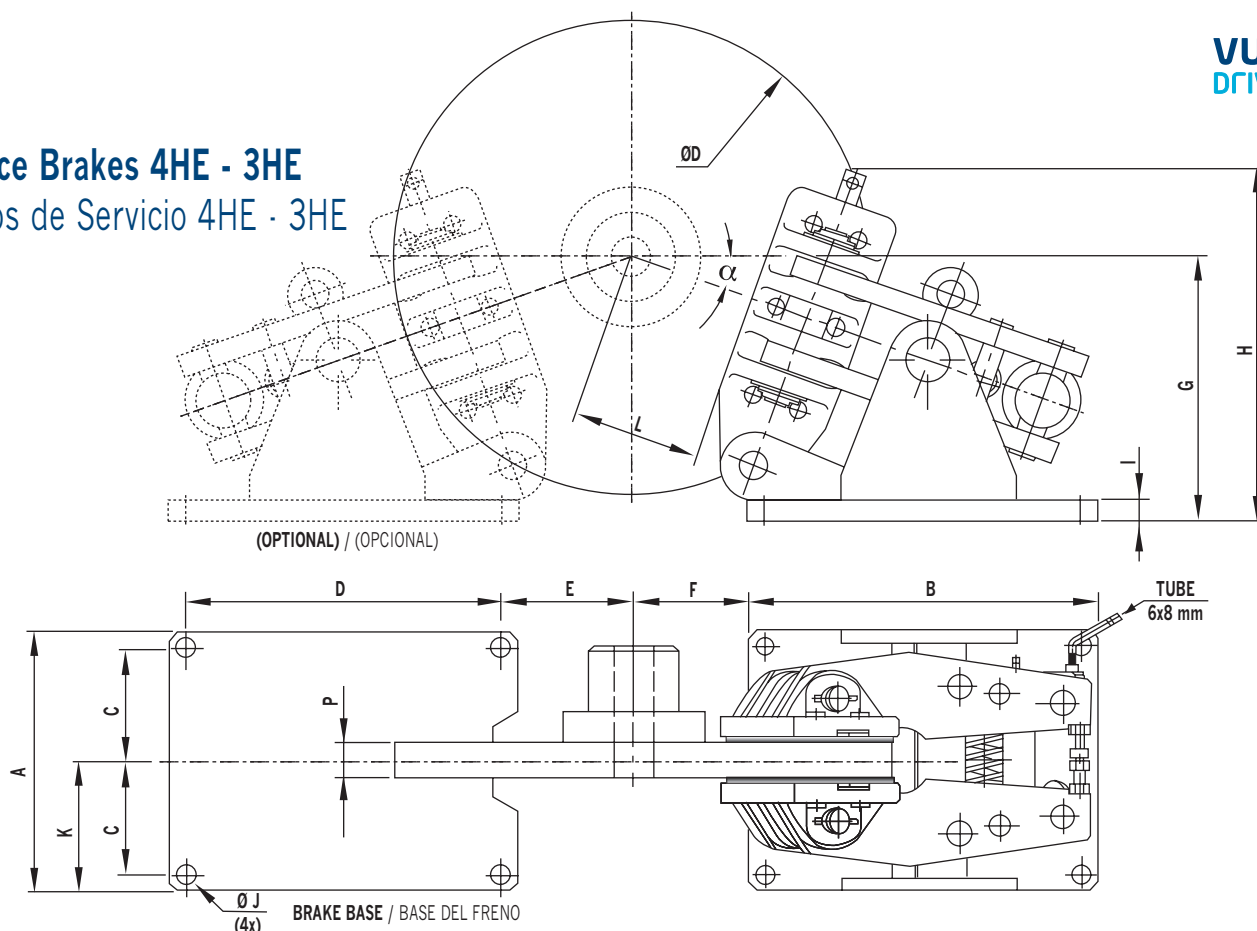






## Service Brakes 4HE - 3HE

### Frenos de Servicio 4HE - 3HE



|                                |                               |                                                           |                                     |
|--------------------------------|-------------------------------|-----------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 4HE</b>       | <b>65 [kgf]</b>               | <b>Maximum work pressure</b><br>Presión máxima de trabajo | <b>50 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Hydraulic / Hidráulico</b> | <b>Worn-out adjustment /</b><br>Regulación del desgaste:  | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Spring / Por Resortes</b>  | <b>Pads Area</b><br>Área de las guarniciones              | <b>275 [cm²]</b>                    |

#### 4HE Brake / Freno 4HE

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |       |     |     |     |     |     |    |     |     |     |    |        |
|--------------|---------|--------|-----------------------------------------------------|-----|-------|-----|-----|-----|-----|-----|----|-----|-----|-----|----|--------|
| ØD [mm]      | 4HE     | 4HE    | A                                                   | B   | C     | D   | E   | F   | G   | H   | I  | J   | K   | L   | P  | α      |
| 445          | 1.150   | 7.000  | 270                                                 | 300 | 117,5 | 260 | 130 | 110 | 225 | 290 | 20 | Ø22 | 135 | 90  | 30 | 17°30' |
| 495          | 1.300   |        |                                                     |     |       |     | 160 | 140 | 235 |     |    |     |     | 115 |    |        |
| 550          | 1.500   |        |                                                     |     |       |     | 180 | 160 | 240 |     |    |     |     | 145 |    |        |
| 625          | 1.800   |        |                                                     |     |       |     | 215 | 195 | 250 |     |    |     |     | 180 |    |        |
| 705          | 2.100   |        |                                                     |     |       |     | 255 | 235 | 260 |     |    |     |     | 225 |    |        |
| 795          | 2.400   |        |                                                     |     |       |     | 295 | 275 | 275 |     |    |     |     | 265 |    |        |

|                                |                               |                                                           |                                     |
|--------------------------------|-------------------------------|-----------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 3HE</b>       | <b>125 [kgf]</b>              | <b>Maximum work pressure</b><br>Presión máxima de trabajo | <b>70 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Hydraulic / Hidráulico</b> | <b>Worn-out adjustment /</b><br>Regulación del desgaste:  | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Spring / Por Resortes</b>  | <b>Pads Area</b><br>Área de las guarniciones              | <b>535 [cm²]</b>                    |

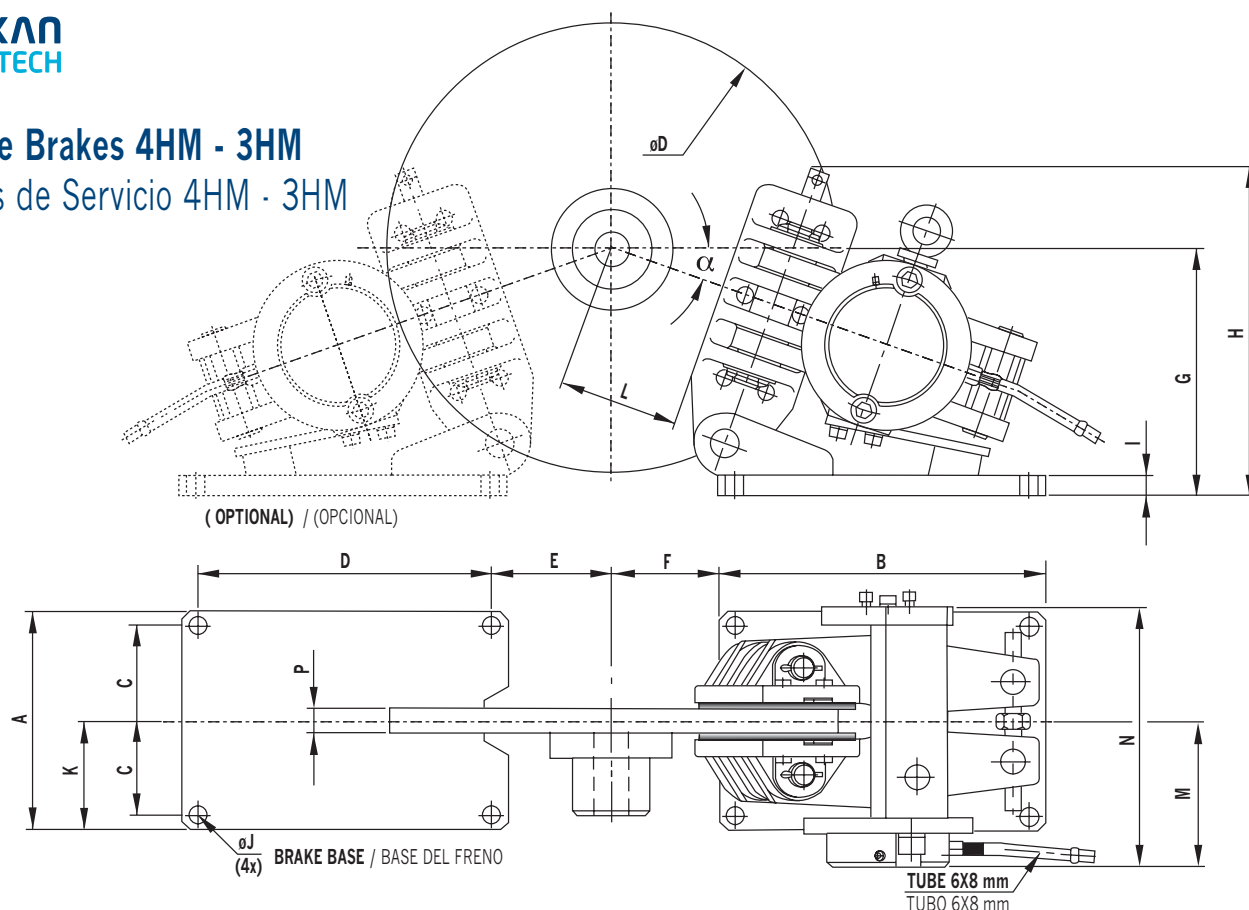
#### 3HE Brake / Freno 3HE

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |       |     |     |     |     |     |    |     |       |     |    |        |
|--------------|---------|--------|-----------------------------------------------------|-----|-------|-----|-----|-----|-----|-----|----|-----|-------|-----|----|--------|
| ØD [mm]      | 3HE     | 3HE    | A                                                   | B   | C     | D   | E   | F   | G   | H   | I  | J   | K     | L   | P  | α      |
| 445          | 1.800   | 10.700 | 275                                                 | 400 | 117,5 | 360 | 100 | 80  | 285 | 410 | 25 | Ø22 | 137,5 | 90  | 30 | 19°30' |
| 495          | 2.070   |        |                                                     |     |       |     | 120 | 100 | 295 |     |    |     |       | 115 |    |        |
| 550          | 2.370   |        |                                                     |     |       |     | 150 | 130 | 305 |     |    |     |       | 145 |    |        |
| 625          | 2.770   |        |                                                     |     |       |     | 185 | 165 | 315 |     |    |     |       | 180 |    |        |
| 705          | 3.200   |        |                                                     |     |       |     | 225 | 205 | 330 |     |    |     |       | 225 |    |        |
| 795          | 3.690   |        |                                                     |     |       |     | 265 | 245 | 345 |     |    |     |       | 265 |    |        |



## Service Brakes 4HM - 3HM

### Frenos de Servicio 4HM - 3HM



|                                |                               |                                                                                |                                     |
|--------------------------------|-------------------------------|--------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 4HM</b>       | <b>80 [kgf]</b>               | <b>Maximum work pressure</b><br>Presión máxima de trabajo                      | <b>55 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Spring / Por Resortes</b>  | <b>Pads worn-out adjustment</b><br>Regulación del desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Hydraulic / Hidráulico</b> | <b>Pads Area</b><br>Área de las guarniciones                                   | <b>275 [cm²]</b>                    |

#### 4HM Brake / Freno 4HM

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |       |     |     |     |     |     |    |     |       |     |    |       |     |        |
|--------------|---------|--------|-----------------------------------------------------|-----|-------|-----|-----|-----|-----|-----|----|-----|-------|-----|----|-------|-----|--------|
| ØD [mm]      | 4HM     | 4HM    | A                                                   | B   | C     | D   | E   | F   | G   | H   | I  | J   | K     | L   | P  | M     | N   | α      |
| 445          | 1.150   | 7.000  | 275                                                 | 300 | 117,5 | 260 | 130 | 110 | 225 | 290 | 20 | Ø22 | 137,5 | 90  | 30 | 162,5 | 327 | 17°30' |
| 495          | 1.300   |        |                                                     |     |       |     | 160 | 140 | 235 |     |    |     |       | 115 |    |       |     |        |
| 550          | 1.500   |        |                                                     |     |       |     | 180 | 160 | 240 |     |    |     |       | 145 |    |       |     |        |
| 625          | 1.800   |        |                                                     |     |       |     | 215 | 195 | 250 |     |    |     |       | 180 |    |       |     |        |
| 705          | 2.100   |        |                                                     |     |       |     | 255 | 235 | 260 |     |    |     |       | 225 |    |       |     |        |
| 795          | 2.400   |        |                                                     |     |       |     | 295 | 275 | 275 |     |    |     |       | 265 |    |       |     |        |

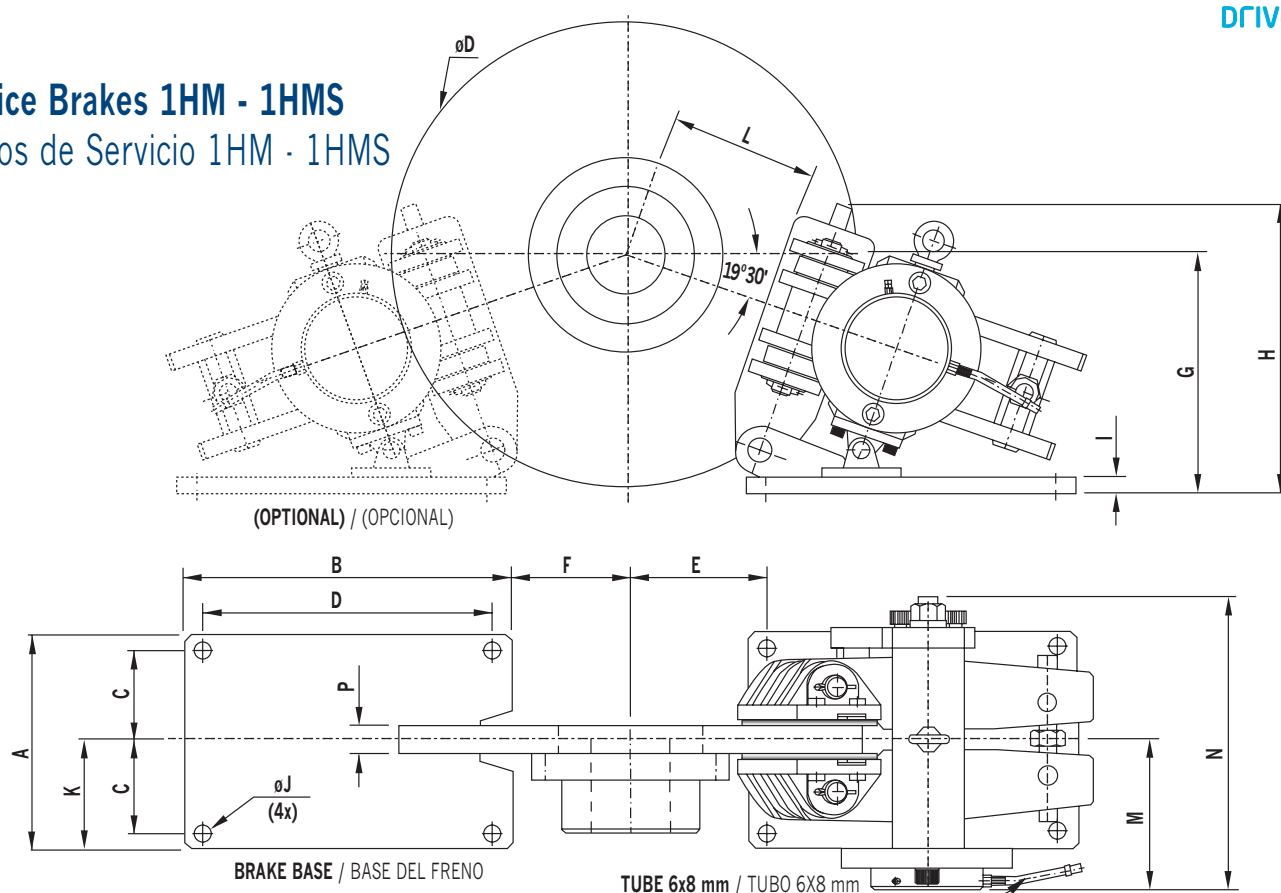
|                                |                               |                                                                                |                                     |
|--------------------------------|-------------------------------|--------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 3HM</b>       | <b>140 [kgf]</b>              | <b>Maximum work pressure</b><br>Presión máxima de trabajo                      | <b>55 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Spring / Por Resortes</b>  | <b>Pads worn-out adjustment</b><br>Regulación del desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Hydraulic / Hidráulica</b> | <b>Pads Area</b><br>Área de las guarniciones                                   | <b>535 [cm²]</b>                    |

#### 3HM Brake / Freno 3HM

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |       |     |     |     |     |     |    |     |       |     |    |     |     |        |
|--------------|---------|--------|-----------------------------------------------------|-----|-------|-----|-----|-----|-----|-----|----|-----|-------|-----|----|-----|-----|--------|
| ØD [mm]      | 3HM     | 3HM    | A                                                   | B   | C     | D   | E   | F   | G   | H   | I  | J   | K     | L   | P  | M   | N   | α      |
| 445          | 1.80    | 10.700 | 275                                                 | 400 | 117,5 | 360 | 100 | 80  | 284 | 410 | 25 | Ø22 | 137,5 | 90  | 30 | 180 | 340 | 19°30' |
| 495          | 2.070   |        |                                                     |     |       |     | 124 | 104 | 292 |     |    |     |       | 115 |    |     |     |        |
| 550          | 2.370   |        |                                                     |     |       |     | 150 | 130 | 301 |     |    |     |       | 143 |    |     |     |        |
| 625          | 2.770   |        |                                                     |     |       |     | 180 | 165 | 314 |     |    |     |       | 180 |    |     |     |        |
| 705          | 3.200   |        |                                                     |     |       |     | 223 | 203 | 327 |     |    |     |       | 220 |    |     |     |        |
| 795          | 3.690   |        |                                                     |     |       |     | 265 | 245 | 342 |     |    |     |       | 265 |    |     |     |        |

## Service Brakes 1HM - 1HMS

### Frenos de Servicio 1HM - 1HMS



|                                |                               |                                                                                |                                     |
|--------------------------------|-------------------------------|--------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 1HM</b>       | <b>200 [kgf]</b>              | <b>Maximum work pressure</b><br>Presión máxima de trabajo                      | <b>55 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Spring / Por Resortes</b>  | <b>Pads worn-out adjustment</b><br>Regulación del desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Hydraulic / Hidráulica</b> | <b>Pads Area</b><br>Área de las guarniciones                                   | <b>535 [cm²]</b>                    |

#### 1HM Brake / Freno 1HM

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |     |     |     |     |     |     |    |     |     |     |     |     |    |
|--------------|---------|--------|-----------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|----|
| ØD [mm]      | 1HM     | 1HM    | A                                                   | B   | C   | D   | E   | F   | G   | H   | I  | J   | K   | L   | M   | N   | P  |
| 550          | 4.320   | 19.600 | 330                                                 | 500 | 140 | 440 | 134 | 104 | 341 | 445 | 25 | Ø27 | 165 | 145 | 230 | 450 | 42 |
| 625          | 5.050   |        |                                                     |     |     |     | 167 | 137 | 352 |     |    |     |     | 180 |     |     |    |
| 705          | 5.840   |        |                                                     |     |     |     | 209 | 179 | 367 |     |    |     |     | 225 |     |     |    |
| 795          | 6.720   |        |                                                     |     |     |     | 247 | 217 | 381 |     |    |     |     | 265 |     |     |    |
| 995          | 8.680   |        |                                                     |     |     |     | 345 | 315 | 415 |     |    |     |     | 370 |     |     |    |

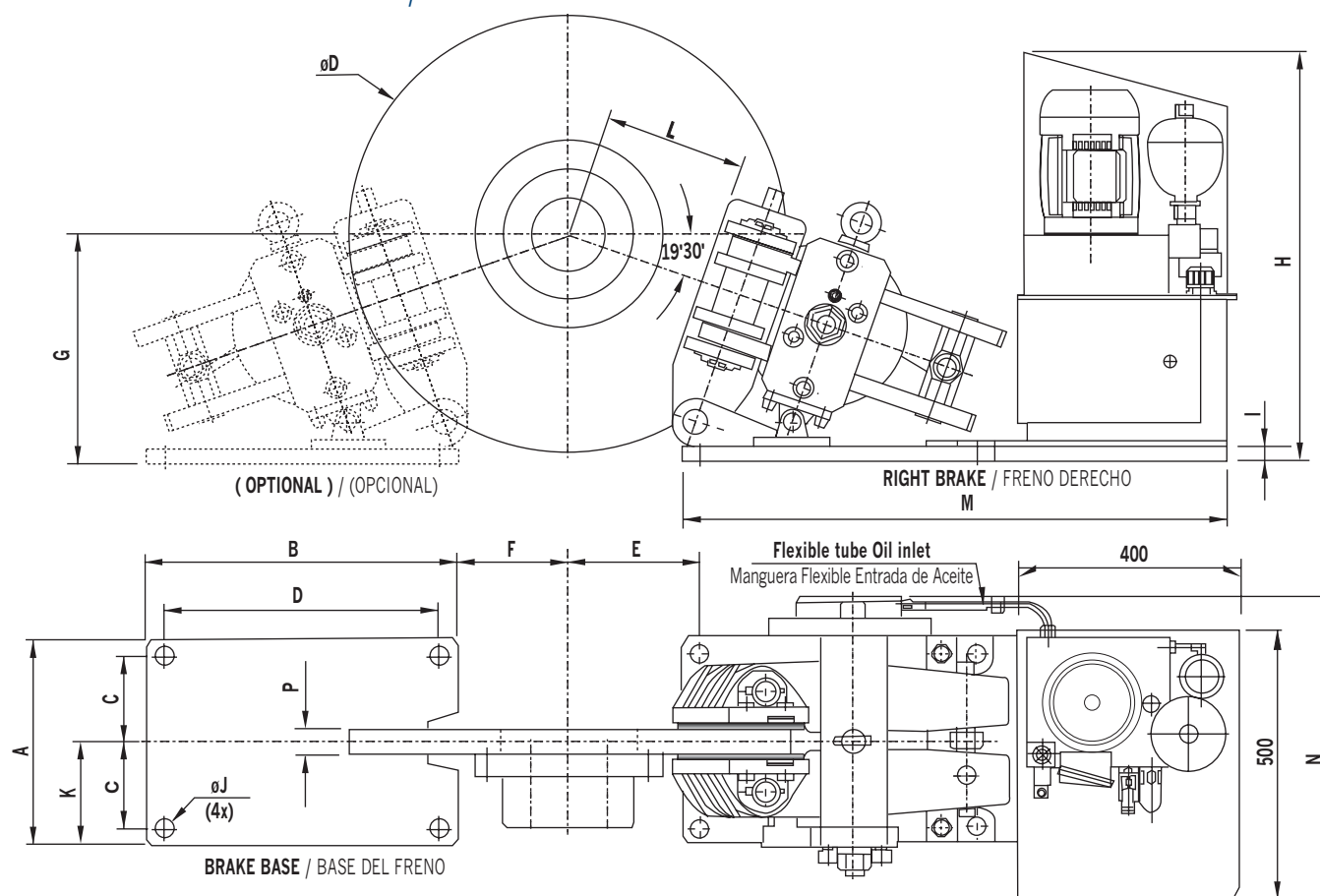
|                                |                               |                                                                                   |                                     |
|--------------------------------|-------------------------------|-----------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso 1HMS</b>      | <b>250 [kgf]</b>              | <b>Maximum work pressure</b><br>Presión máxima de trabajo                         | <b>80 [bar]</b>                     |
| <b>Applying / Frenado:</b>     | <b>Spring / Por Resortes</b>  | <b>Pads Wearing out adjustment</b><br>Regulación del desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b> | <b>Hydraulic / Hidráulica</b> | <b>Pads Area</b><br>Área de las guarniciones                                      | <b>535 [cm²]</b>                    |

#### 1HMS Brake / Freno 1HMS

| Discs/Discos | MF [Nm] | EF [N] | Main Dimensions [mm] / Dimensiones Principales [mm] |     |     |     |     |     |     |     |    |     |     |     |     |     |    |
|--------------|---------|--------|-----------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|----|
| ØD [mm]      | 1HMS    | 1HMS   | A                                                   | B   | C   | D   | E   | F   | G   | H   | I  | J   | K   | L   | M   | N   | P  |
| 550          | 6.700   | 31.000 | 330                                                 | 500 | 140 | 440 | 134 | 104 | 341 | 445 | 25 | Ø27 | 165 | 145 | 230 | 450 | 42 |
| 625          | 7.870   |        |                                                     |     |     |     | 167 | 137 | 352 |     |    |     |     | 180 |     |     |    |
| 705          | 9.120   |        |                                                     |     |     |     | 209 | 179 | 367 |     |    |     |     | 225 |     |     |    |
| 795          | 10.520  |        |                                                     |     |     |     | 247 | 217 | 381 |     |    |     |     | 265 |     |     |    |
| 995          | 13.635  |        |                                                     |     |     |     | 345 | 315 | 415 |     |    |     |     | 370 |     |     |    |

## Service Brakes 3HM - UHF / 1HM - UHF

### Frenos de Servicio 3HM - UHF / 1HM - UHF



|                                                                      |                               |                                                                                   |                                     |
|----------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|-------------------------------------|
| <b>Weight / Peso - 3HM - UHF</b><br><b>Weight / Peso - 1HM - UHF</b> | <b>340 [kgf]</b>              | <b>Mínima Brake Opening pressure</b><br>Presión mínima de apertura del Freno      | <b>55 [bar]</b><br><b>60 [cm²]</b>  |
| <b>Applying / Frenado:</b>                                           | <b>Spring / Por Resortes</b>  | <b>Pads Wearing out Adjustment</b><br>Regulación del desgaste de las guarniciones | <b>Mechanical - Manual / Manual</b> |
| <b>Releasing / Desfrenado:</b>                                       | <b>Hydraulic / Hidráulico</b> | <b>Pads Area</b><br>Área de las guarniciones                                      | <b>535 [cm²]</b>                    |

#### 3HM - UHF Brake / Freno 3HM - UHF

| Discs/Discos | MF [Nm]   | EF [N]    | Main Dimensions [mm] / Dimensiones Principales [mm] |     |       |     |     |     |     |     |    |     |     |     |     |     |    |
|--------------|-----------|-----------|-----------------------------------------------------|-----|-------|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|----|
| ØD [mm]      | 3HM - UHF | 3HM - UHF | A                                                   | B   | C     | D   | E   | F   | G   | H   | I  | J   | K   | L   | M   | N   | P  |
| 445          | 1.800     | 10.700    | 275                                                 | 400 | 117,5 | 360 | 100 | 80  | 285 | 660 | 25 | Ø22 | 135 | 90  | 800 | 550 | 30 |
| 495          | 2.070     |           |                                                     |     |       |     | 120 | 100 | 295 |     |    |     |     | 115 |     |     |    |
| 550          | 2.370     |           |                                                     |     |       |     | 150 | 130 | 305 |     |    |     |     | 145 |     |     |    |
| 625          | 2.770     |           |                                                     |     |       |     | 185 | 165 | 315 |     |    |     |     | 180 |     |     |    |
| 705          | 3.200     |           |                                                     |     |       |     | 225 | 205 | 330 |     |    |     |     | 225 |     |     |    |
| 795          | 3.690     |           |                                                     |     |       |     | 265 | 245 | 345 |     |    |     |     | 265 |     |     |    |

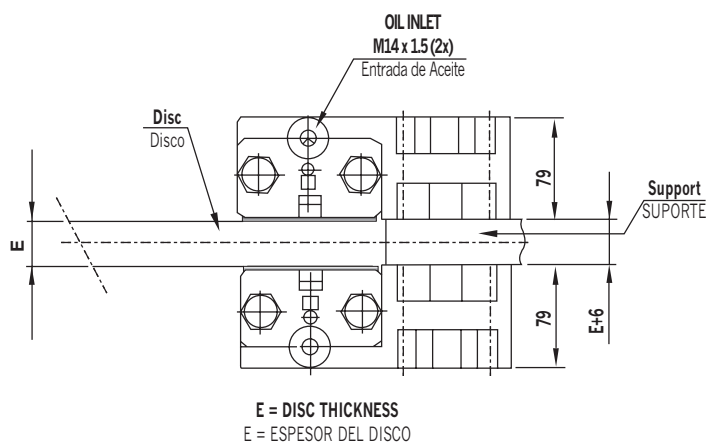
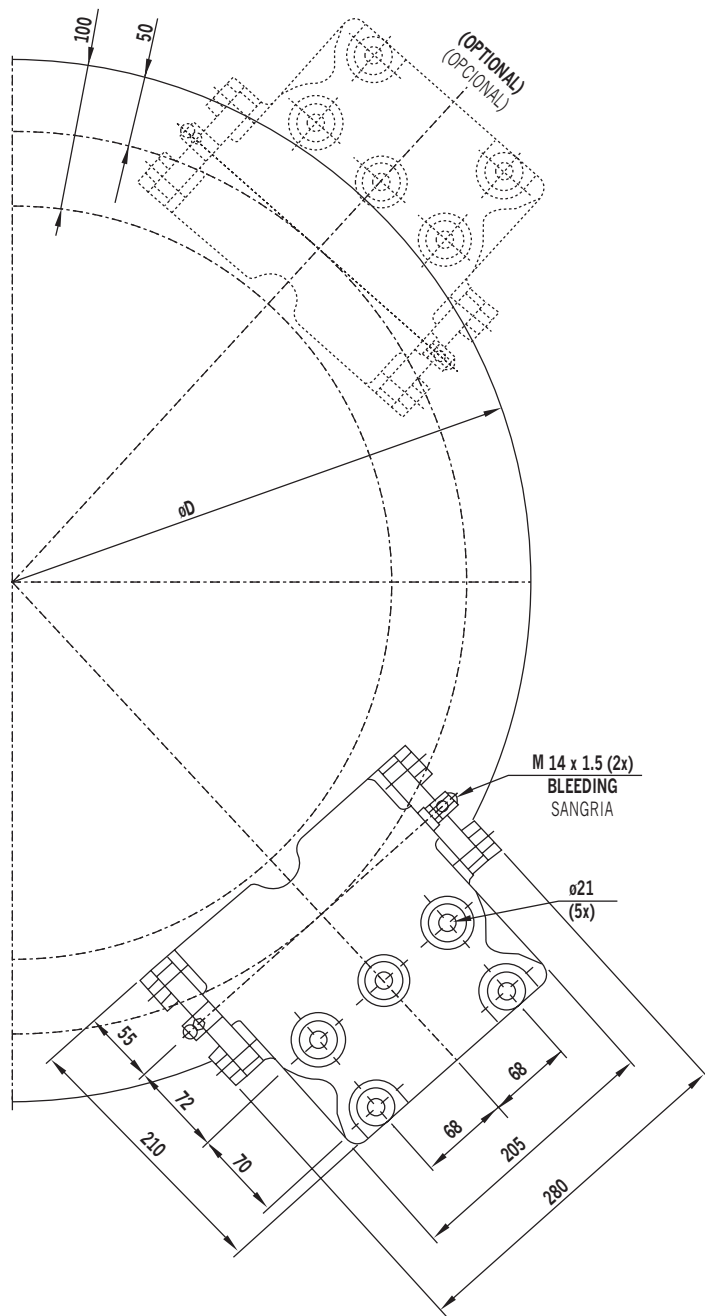
#### 1HM - UHF Brake / Freno 1HM - UHF

| Discs/Discos | MF [Nm]   | EF [N]    | Main Dimensions [mm] / Dimensiones Principales [mm] |     |     |     |     |     |     |     |    |     |     |     |     |     |    |
|--------------|-----------|-----------|-----------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|----|
| ØD [mm]      | 1HM - UHF | 1HM - UHF | A                                                   | B   | C   | D   | E   | F   | G   | H   | I  | J   | K   | L   | M   | N   | P  |
| 550          | 4.320     | 19.600    | 330                                                 | 500 | 140 | 440 | 134 | 104 | 341 | 660 | 25 | Ø27 | 165 | 145 | 900 | 550 | 42 |
| 625          | 5.050     |           |                                                     |     |     |     | 167 | 137 | 352 |     |    |     |     | 180 |     |     |    |
| 705          | 5.840     |           |                                                     |     |     |     | 209 | 179 | 367 |     |    |     |     | 225 |     |     |    |
| 795          | 6.720     |           |                                                     |     |     |     | 247 | 217 | 381 |     |    |     |     | 265 |     |     |    |
| 995          | 8.680     |           |                                                     |     |     |     | 345 | 315 | 415 |     |    |     |     | 370 |     |     |    |



## Service Brake FHGE77

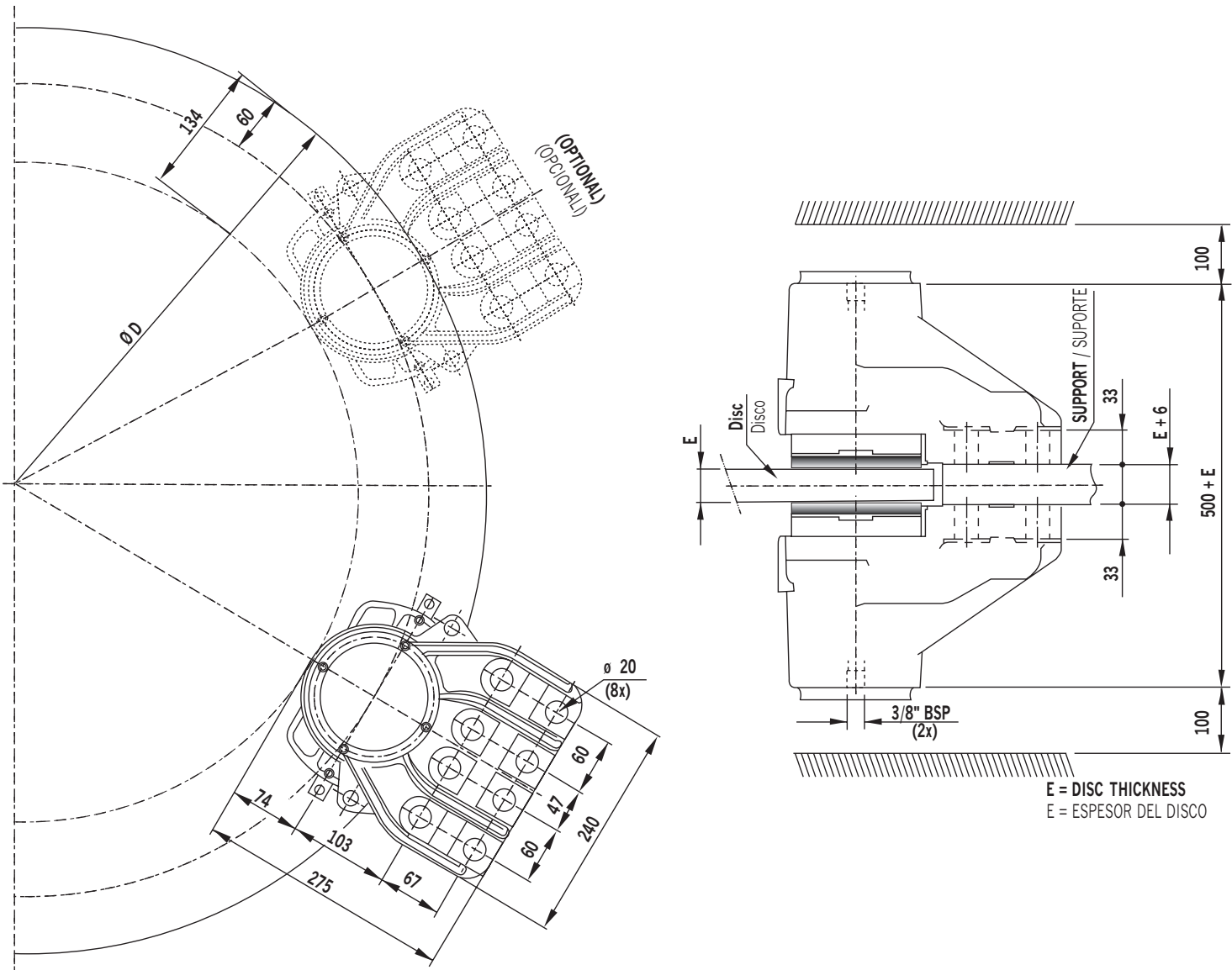
### Freno de Servicio FHGE77



|                                |                                              |                                              |                                               |
|--------------------------------|----------------------------------------------|----------------------------------------------|-----------------------------------------------|
| <b>Weight / Peso - FHGE77</b>  | <b>57 [kgf]</b>                              | <b>Disc thickness</b><br>Espesor del Disco   | <b>As per Application</b><br>Según Aplicación |
| <b>Applying / Frenado</b>      | <b>Hydraulic / Hidráulico</b>                | <b>Fluid / Fluido</b>                        | <b>Mineral Oil / Aceite Mineral</b>           |
| <b>Releasing / Desfrenado:</b> | <b>Spring / Alivio de presión e resortes</b> | <b>Pads Area</b><br>Área de las guarniciones | <b>480 [cm²]</b>                              |

|                                                                                                      |                                     |
|------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Braking Force (EF) / Fuerza de Frenado (EF)</b>                                                   | <b>450 [N / bar]</b>                |
| <b>Braking Torque (TF) / Par de Frenado (TF)</b>                                                     | <b>TF = 0.0005 x EF x (D - 100)</b> |
| <b>Minimum Pressure / Presión Mínima de Trabajo</b>                                                  | <b>03 [bar]</b>                     |
| <b>Maximum Pressure / Presión Máxima de Trabajo</b>                                                  | <b>80 [bar]</b>                     |
| <b>Where: D means disc diameter in millimeters / Donde: D es el diámetro del disco en milímetros</b> |                                     |

Emergency Brake EH-08  
Freno de Emergencia EH-08

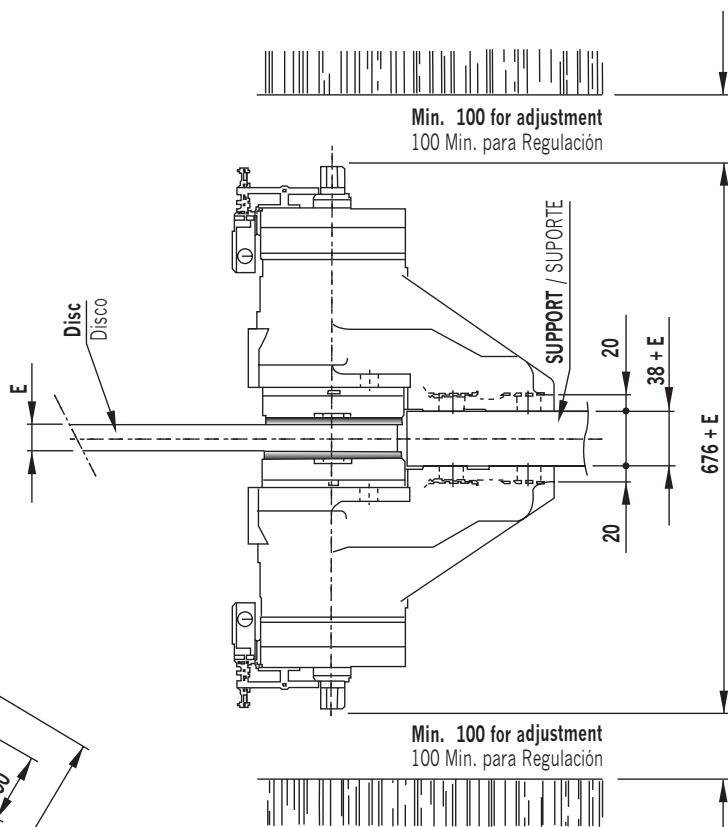
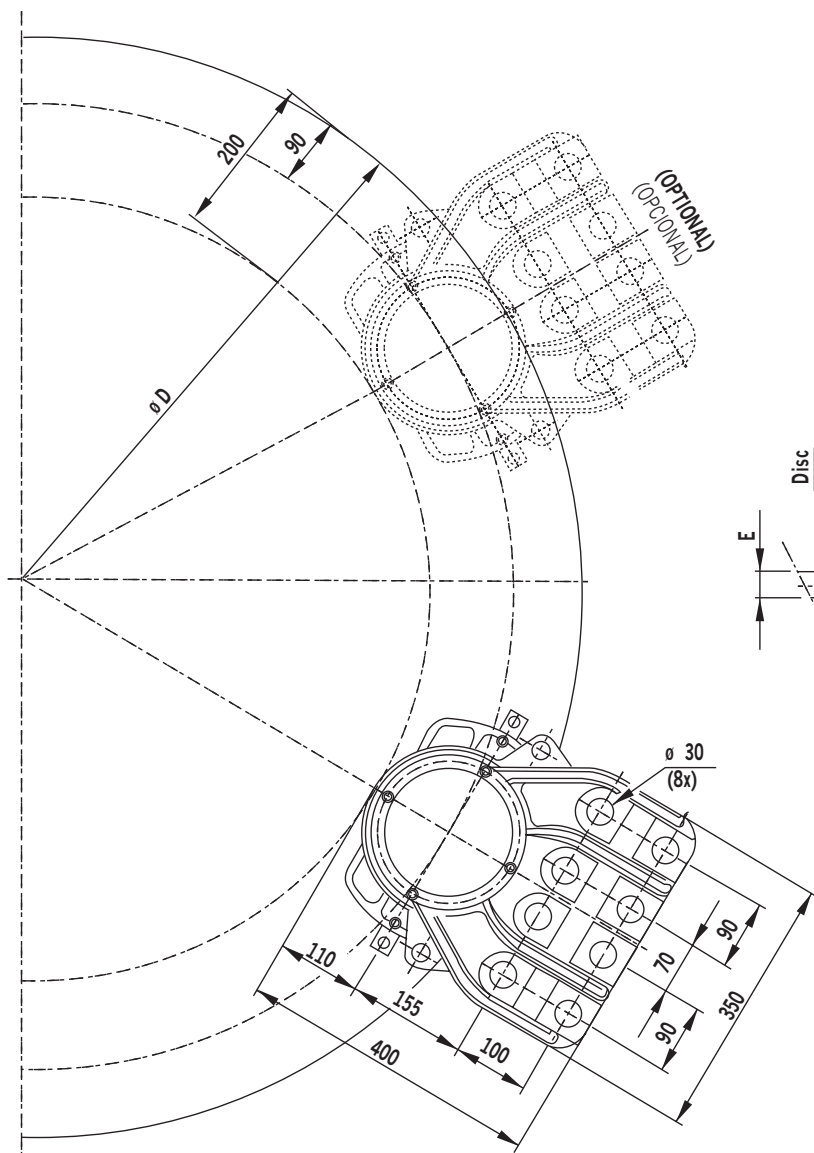


|                         |                        |                                                |                                        |
|-------------------------|------------------------|------------------------------------------------|----------------------------------------|
| Weight / Peso - EH-08   | 120 [kgf]              | Worn-out Adjustment<br>Regulación del Desgaste | Mechanical - Manual<br>Manual          |
| Applying / Frenado      | Hydraulic / Hidráulico | Disc thickness<br>Espesor del Disco            | As per Application<br>Según Aplicación |
| Releasing / Desfrenado: | Spring / Resortes      | Pads Area<br>Área de las guarniciones          | 640 [cm²]                              |

|                                                                                               |                              |
|-----------------------------------------------------------------------------------------------|------------------------------|
| Braking Force (EF) / Fuerza de Frenado (EF)                                                   | 480 [N / bar]                |
| Braking Torque (TF) / Par de Frenado (TF)                                                     | TF = 0.0005 x EF x (D - 120) |
| Minimum Pressure / Presión Mínima de Trabajo                                                  | 03 [bar]                     |
| Maximum Pressure / Presión Máxima de Trabajo                                                  | 80 [bar]                     |
| Where: D means disc diameter in millimeters / Donde: D es el diámetro del disco en milímetros |                              |

## Emergency Brake EH-12

### Freno de Emergencia EH-12



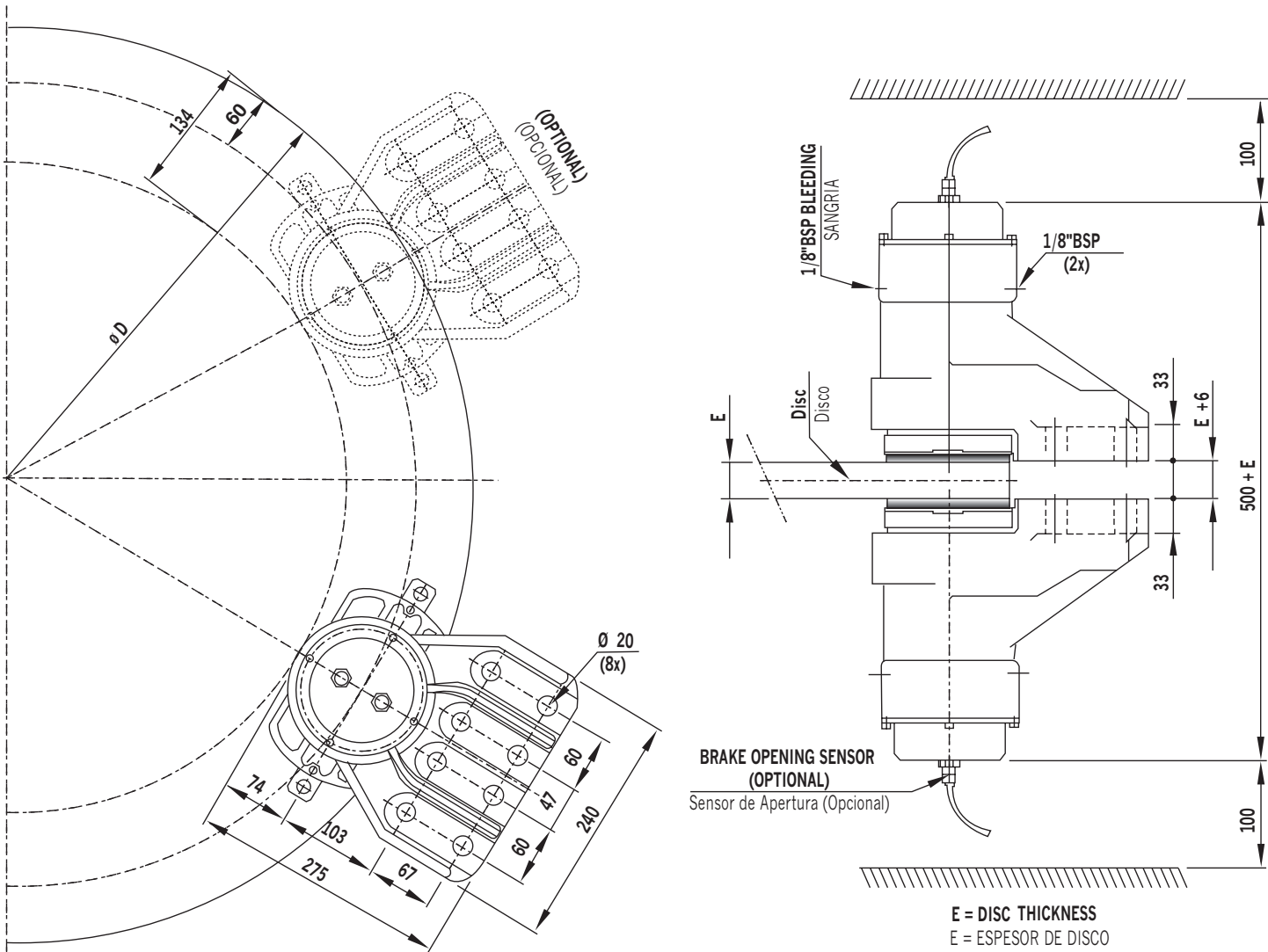
E = DISC THICKNESS  
E = ESPESOR DEL DISCO

|                         |                        |                                                |                                        |
|-------------------------|------------------------|------------------------------------------------|----------------------------------------|
| Weight / Peso - EH-12   | 240 [kgf]              | Worn-out Adjustment<br>Regulación del Desgaste | Mechanical - Manual<br>Manual          |
| Applying / Frenado      | Hydraulic / Hidráulico | Disc thickness<br>Espesor del Disco            | As per Application<br>Según Aplicación |
| Releasing / Desfrenado: | Spring / Resortes      | Pads Area<br>Área de las guarniciones          | 820 [cm²]                              |

|                                                                                               |                                          |
|-----------------------------------------------------------------------------------------------|------------------------------------------|
| Braking Force (EF) / Fuerza de Frenado (EF)                                                   | 750 [N / bar]                            |
| Braking Torque (TF) / Par de Frenado (TF)                                                     | $TF = 0.0005 \times EF \times (D - 180)$ |
| Minimum Pressure / Presión Mínima de Trabajo                                                  | 03 [bar]                                 |
| Maximum Pressure / Presión Máxima de Trabajo                                                  | 80 [bar]                                 |
| Where: D means disc diameter in millimeters / Donde: D es el diámetro del disco en milímetros |                                          |



Emergency Brakes SH-08-1 - SH-08-2  
Frenos de Emergencia SH-08-1 - SH-08-2

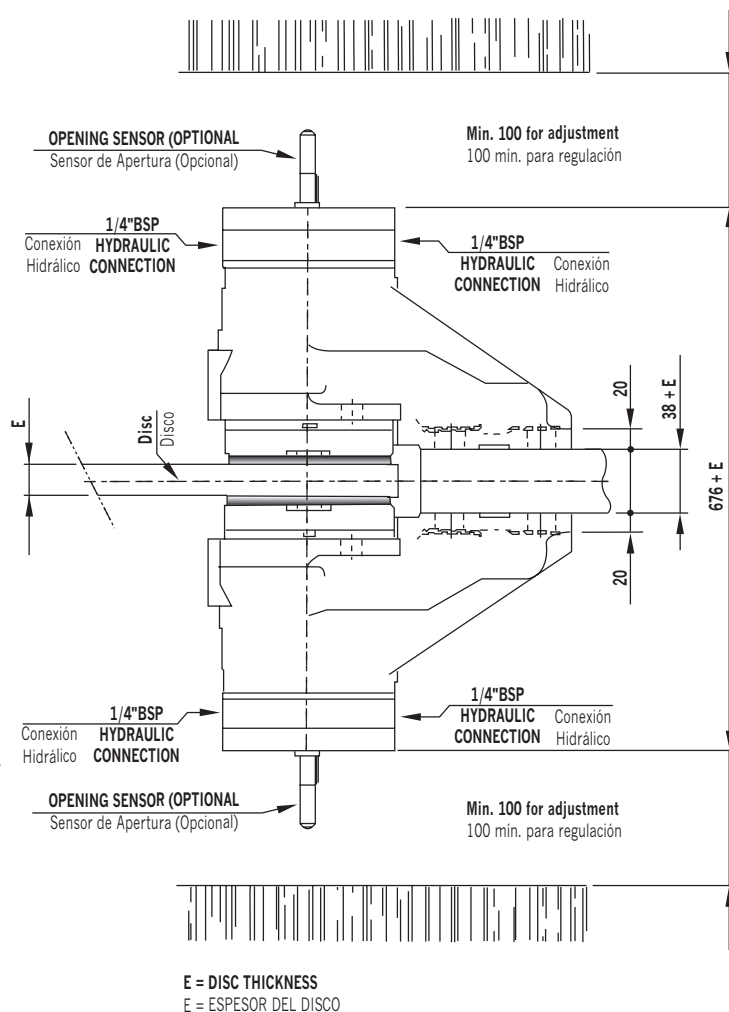
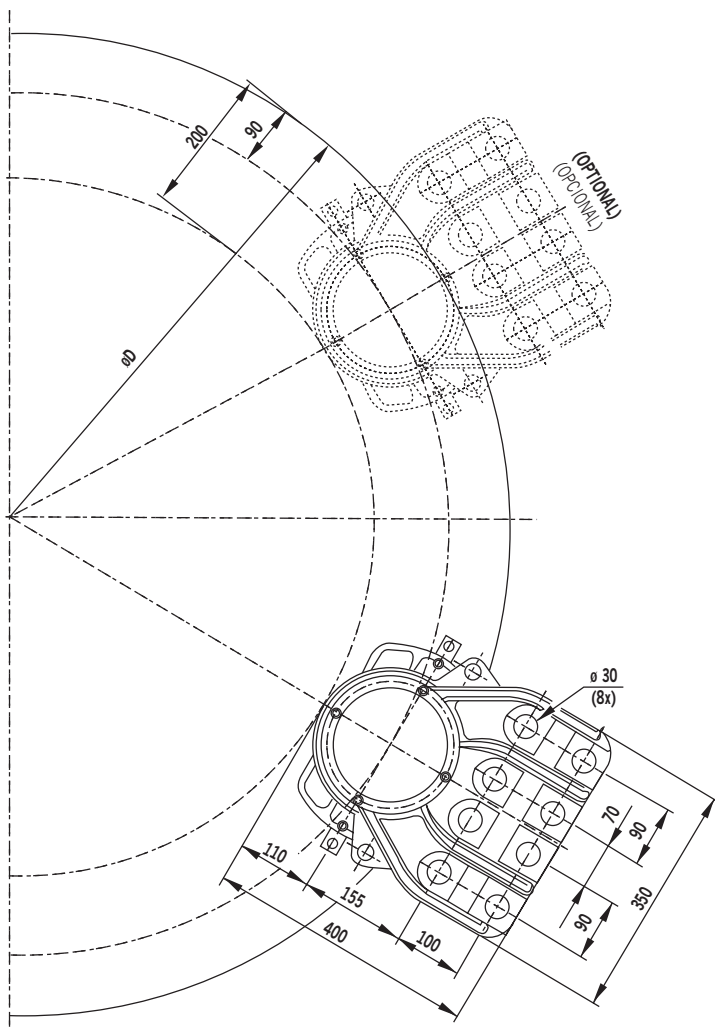


|                              |                              |                                                |                                        |
|------------------------------|------------------------------|------------------------------------------------|----------------------------------------|
| Weight / Peso                | 120 [kgf]                    | Worn-out Adjustment<br>Regulación del Desgaste | Mechanical - Manual<br>Manual          |
| Applying / Frenado           | Spring / Resortes            | Disc thickness<br>Espesor del Disco            | As per Application<br>Según Aplicación |
| Releasing / Desfrenado:      | Hydraulic / Hidráulico       | Pads Area<br>Área de las guarniciones          | 640 [cm²]                              |
| Braking<br>Torque de Frenado | TF = 0.0005 x EF x (D - 120) | Oil Volume<br>Volumen Aceite                   | 20 [cm³] / [mm]                        |

| Models<br>Modelos             | Braking Force (EF)<br>Fuerza de Frenado (EF) | Opening Pressures<br>Presiones de Apertura |
|-------------------------------|----------------------------------------------|--------------------------------------------|
| Brake SH-08-1 / Freno SH-08-1 | 20.000 [N]                                   | 40 [bar] min. / 50 [bar] max               |
| Brake SH-08-2 / Freno SH-08-2 | 10.000 [N]                                   | 25 [bar] min. / 35 [bar] max               |

## Emergency Brakes: SH12-E - SH12-1 - SH12-2 - SH12-3

### Frenos de Emergencia SH12-E · SH12-1 · SH12-2 · SH12-3

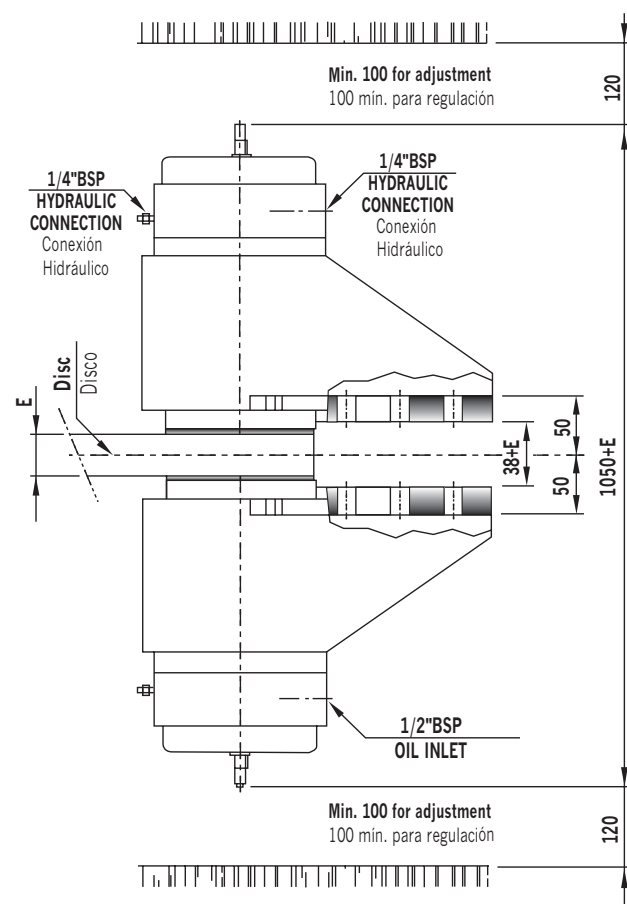
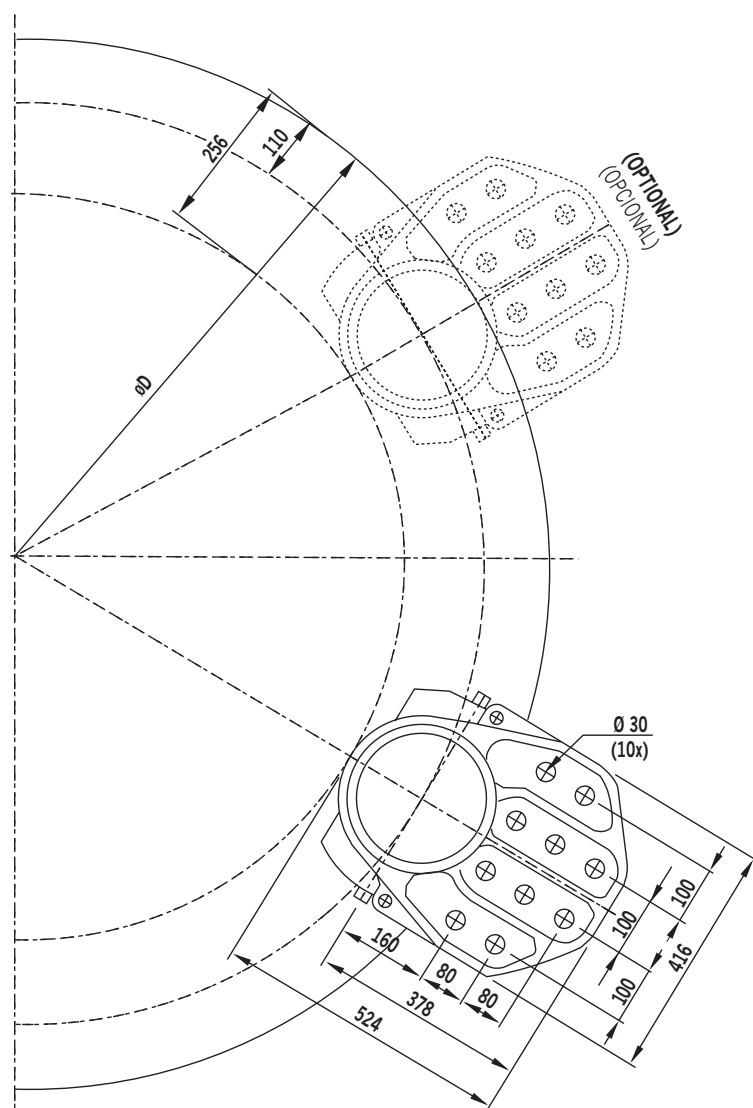


|                                     |                                     |                                                      |                                               |
|-------------------------------------|-------------------------------------|------------------------------------------------------|-----------------------------------------------|
| <b>Weight / Peso</b>                | <b>240 [kgf]</b>                    | <b>Worn-out Adjustment</b><br>Regulación de Desgaste | <b>Mechanical - Manual</b><br>Manual          |
| <b>Applying / Frenado</b>           | <b>Spring / Resortes</b>            | <b>Disc thickness</b><br>Espesor del Disco           | <b>As per Application</b><br>Según Aplicación |
| <b>Releasing / Desfrenado:</b>      | <b>Hydraulic / Hidráulico</b>       | <b>Pads Area</b><br>Área de las guarniciones         | <b>820 [cm²]</b>                              |
| <b>Braking</b><br>Torque de Frenado | <b>TF = 0.0005 x EF x (D - 180)</b> | <b>Oil Volume</b><br>Volumen Aceite                  | <b>40 [cm³] / [mm]</b>                        |

| <b>Models</b><br>Modelos             | <b>Braking Force (EF)</b><br>Fuerza de Frenado (EF) | <b>Opening Pressures</b><br>Presiones de Apertura |
|--------------------------------------|-----------------------------------------------------|---------------------------------------------------|
| <b>Brake SH-12-E / Freno SH-12-E</b> | <b>145.000 [N]</b>                                  | <b>120 [bar] min. / 150 [bar] max</b>             |
| <b>Brake SH-12-1/ Freno SH-12-1</b>  | <b>105.000 [N]</b>                                  | <b>90 [bar] min. / 120 [bar] max</b>              |
| <b>Brake SH-12-2/ Freno SH-12-2</b>  | <b>60.000 [N]</b>                                   | <b>60 [bar] min. / 90 [bar] max</b>               |
| <b>Brake SH-12-3/ Freno SH-12-3</b>  | <b>40.000 [N]</b>                                   | <b>40 [bar] min. / 60 [bar] max</b>               |

## Emergency Brakes: SH-14-1 - SH-14-2 - SH-14-3

### Frenos de Emergencia SH-14-1 · SH14-2 · SH-14-3



|                                     |                                     |                                                       |                                               |
|-------------------------------------|-------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| <b>Weight / Peso</b>                | <b>350 [kgf]</b>                    | <b>Worn-out Adjustment</b><br>Regulación del Desgaste | <b>Mechanical - Manual</b><br>Manual          |
| <b>Applying / Frenado</b>           | <b>Spring / Resortes</b>            | <b>Disc thickness</b><br>Espesor del Disco            | <b>As per Application</b><br>Según Aplicación |
| <b>Releasing / Desfrenado:</b>      | <b>Hydraulic / Hidráulico</b>       | <b>Pads Area</b><br>Área de las guarniciones          | <b>1.270 [cm²]</b>                            |
| <b>Braking</b><br>Torque de Frenado | <b>TF = 0.0005 x EF x (D - 220)</b> | <b>Oil Volume</b><br>Volumen Aceite                   | <b>80 [cm³] / [mm]</b>                        |

| <b>Models</b><br>Modelos             | <b>Braking Force (EF)</b><br>Fuerza de Frenado (EF) | <b>Opening Pressures</b><br>Presiones de Apertura |
|--------------------------------------|-----------------------------------------------------|---------------------------------------------------|
| <b>Brake SH-14-1 / Freno SH-14-1</b> | <b>275.000 [N]</b>                                  | <b>110 [bar] min. / 140 [bar] max</b>             |
| <b>Brake SH-14-2 / Freno SH-14-2</b> | <b>240.000 [N]</b>                                  | <b>100 [bar] min. / 130 [bar] max</b>             |
| <b>Brake SH-14-3 / Freno SH-14-3</b> | <b>190.000 [N]</b>                                  | <b>80 [bar] min. / 110 [bar] max</b>              |

## How to Order your Hydraulic Power Units

### Cómo seleccionar sus Unidades Hidráulicas

Example: / Ejemplo: UH-15L-CH1-GB-MB2-V1-U1-CX-F1-PP-S2,4,5,11

Example:  
Ejemplo:

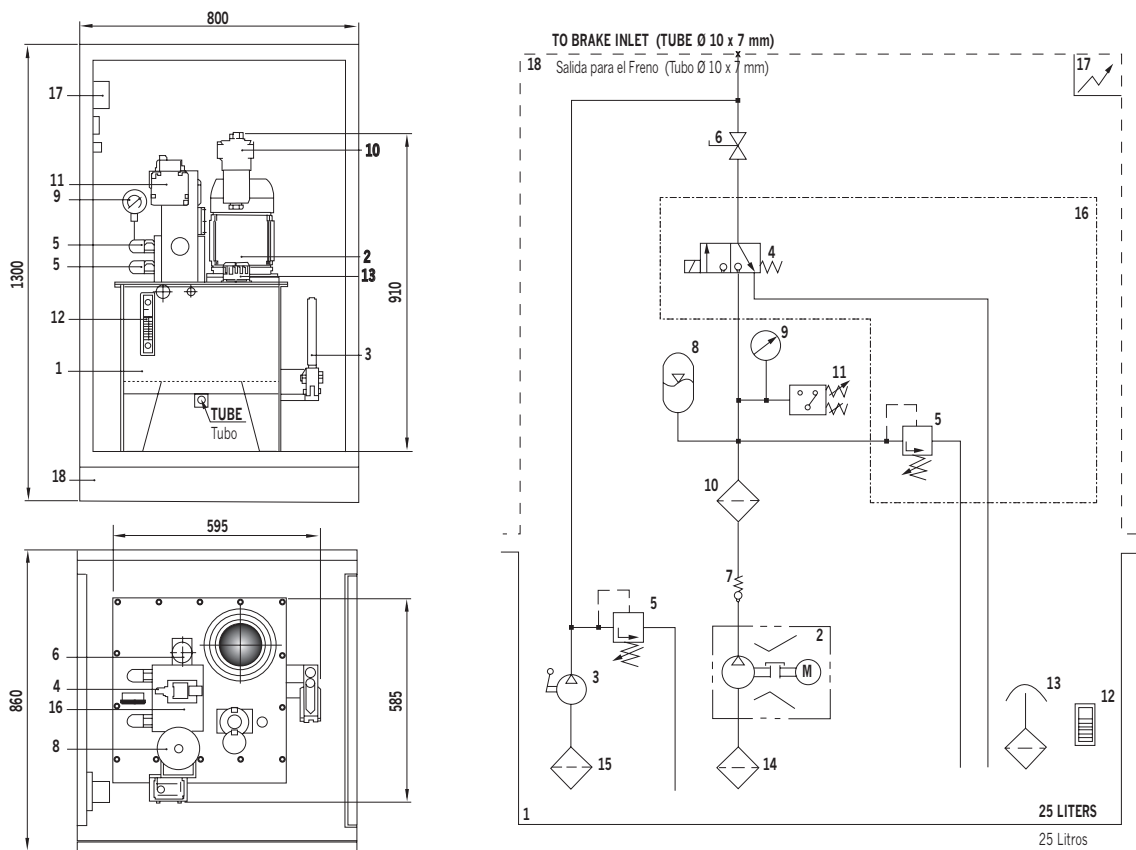
| Hydraulic power unit / Unidades Hidráulicas    |                                             |                   |
|------------------------------------------------|---------------------------------------------|-------------------|
| Volume                                         | Volume                                      |                   |
| 15L – 15 liters                                | 5 litros de volume neto                     | ← UH              |
| 25L – 25 liters                                | 25 litros de volume neto                    |                   |
| 60L – 60 liters                                | 60 litros de volume neto                    |                   |
| 100L – 100 liter                               | 100 litros de volume neto                   |                   |
| Hydraulic Circuit / Circuito Hidraulico        |                                             |                   |
| CH1 – ON-OFF                                   | CH1 – ON-OFF                                | ← 15L             |
| CH2 – Smoothed                                 | CH2 – Suavisada                             |                   |
| CH3 – Proportional                             | CH3 – Proporcional                          |                   |
| CH5 – Emergency                                | CH5 – Emergencia                            |                   |
| CH6 – Proportional – digital                   | CH6 – Proporcional Digital                  |                   |
| CHE – Special                                  | CHE – Especial                              |                   |
| Protection Cabinet / Gabinete especial         |                                             |                   |
| GB – Standard Cabinet IP-54                    | GB – Gabinete Estándar IP-54                | ← CH1             |
| 00 – No Cabinet                                | 00 – No Gabinete                            |                   |
| GE – Special Cabinet                           | GE – Gabinete Especial                      |                   |
| Motor pump / Motobomba                         |                                             |                   |
| MB1 – 1,5cv 4p                                 | MB1 – 1,5cv 4p                              | ← MB2             |
| MB2 – 3cv 4p                                   | MB2 – 3cv 4p                                |                   |
| MB3 – 5cv 4p                                   | MB3 – 5cv 4p                                |                   |
| MBE – Special motor                            | MBE – Motor Especial                        |                   |
| Power Supply Voltage / Tension de alimentación |                                             |                   |
| V1 – 440 Vca / 60Hz 3 Phases                   | V1 – 440 Vca / 60Hz 3 Trifasico             | ← V1              |
| V2 – 380 Vca/60Hz 3 Phases                     | V2 – 380 Vca/60Hz 3 Trifasico               |                   |
| V3 – 220Vca/60Hz 3 Phases                      | V3 – 220Vca/60Hz 3 Trifasico                |                   |
| V4 – 110Vca/60Hz 1 Phases                      | V4 – 110Vca/60Hz 1 Monofásico               |                   |
| VE – Special                                   | VE – Especial                               |                   |
| Control Voltage / Tensión de Control           |                                             |                   |
| U1 – 110 Vca.                                  | U1 – 110 Vca.                               | ← U1              |
| U2 – 220 Vca.                                  | U2 – 220 Vca.                               |                   |
| U3 – 125 Vcc.                                  | U3 – 125 Vcc.                               |                   |
| U4 – 24 Vcc.                                   | U4 – 24 Vcc.                                |                   |
| UE – Special                                   | UE – Especial                               |                   |
| Terminal Box / Caja de Bornes                  |                                             |                   |
| CX – Standard Terminal Box IP-65               | CX – Casa de terminales Estandar IP-65      | ← CX              |
| CE – Special                                   | CE – Especial                               |                   |
| Oil Type / Pintura                             |                                             |                   |
| F1 – Mineral Oil ISO 68 – 25°C                 | F1 – Aceite Mineral ISO 68 – 25°C           | ← F1              |
| F2 – Special                                   | F2 – Especial                               |                   |
| Paint / Pintura                                |                                             |                   |
| PP – Standard Paint                            | PP – Pintura Estándar                       | ← PP              |
| PE – Special                                   | PE – Pintura Especial                       |                   |
| Optionals / Optionals                          |                                             |                   |
| S1 – Hand pump with sensor                     | S1 – Bomba manual con sensor                | ← PP<br>S2,4,5,11 |
| S2 – Hand pump without sensor                  | S2 – Bomba manual sin sensor                |                   |
| S3 – Electronic pressure transducer            | S3 – Transductor de Presión Electronico     |                   |
| S4 – Level sensor                              | S4 – Sensor de nivel                        |                   |
| S5 – Temperature sensor                        | S5 – Sensor de Temperatura                  |                   |
| S6 – Dirt indicator                            | S6 – Indicador de Suciedad                  |                   |
| S7 – Stainless steel tank                      | S7 – Depósito de Acero Inoxidable           |                   |
| S8 – Stainless Steel connections               | S8 – Conexiones de Acero Inoxidable         |                   |
| S10 – Flow regulation valve with Key           | S10 – Valvula Reguladora de flujo con llave |                   |
| S11 – Maximum pressure switch                  | S11 – Presostato de Maxima                  |                   |
| S12 – Critical pressure switch                 | S12 – Presostato de Critico                 |                   |
| S13 – Analog level sensor                      | S13 – Sensor de nivel analogico             |                   |
| S14 – Analog temperature sensor                | S14 – Sensor de Temperatura analogico       |                   |

Note: The eletrical controlpanel shall be ordered separately.

El panel control electrico deberá ser ordenado por separado



Hydraulic Unit: UH - 25L - CH1 - GB - MB2 - V1 - U1 - CX - F1 - PP - S2  
Unidad Hidráulica UH - 25L - CH1 - GB - MB2 - V1 - U1 - CX - F1 - PP - S2



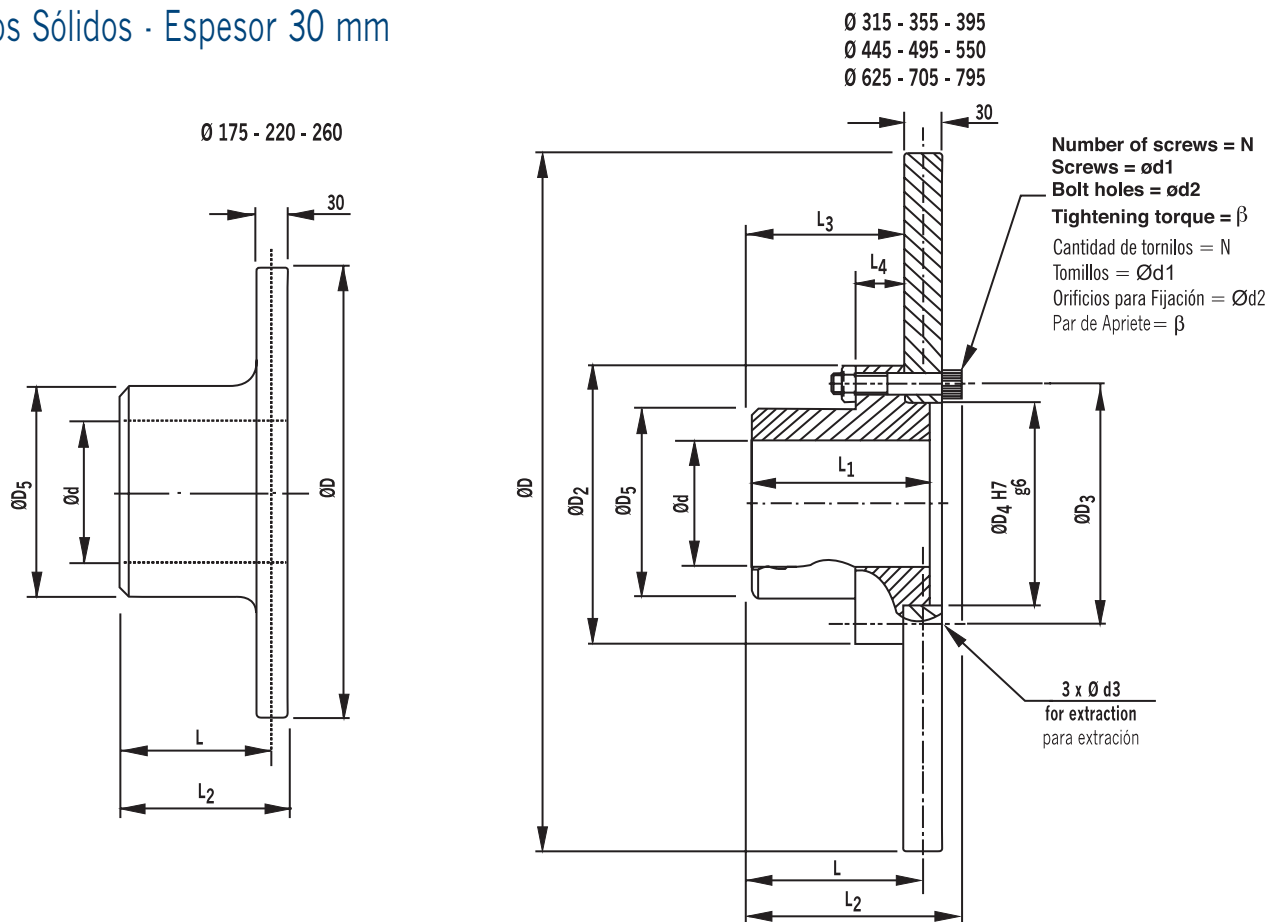
| HYDRAULIC POWER UNIT COMPONENTS |                                                            | COMPONENTES DE LA UNIDAD HIDRÁULICA |                                                                         |
|---------------------------------|------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------|
| POS. / POS.                     | DESCRIPTION / DESCRIPCIÓN                                  | POS. / POS.                         | DESCRIPTION / DESCRIPCIÓN                                               |
| 1                               | 25-liters Tank / Tanque 25 litros                          | 10                                  | Pressure filter / Filtro de presión                                     |
| 2                               | Geared motor-pump<br>Motobomba de engranajes               | 11                                  | Pressure control switch<br>Presostato                                   |
| 3                               | Hand pump / Bomba Manual                                   | 12                                  | Level viewer / Visor de nivel                                           |
| 4                               | Solenoid valve<br>Válvula direccional                      | 13                                  | Filling and air filter<br>Filtro de aire y llenado                      |
| 5                               | Pressure control valves<br>Válvulas reguladoras de presión | 14                                  | Suction filter (electrical pump)<br>Filtro de succión (bomba eléctrica) |
| 6                               | Valve / Registro                                           | 15                                  | Suction filter (manual pump)<br>Filtro de succión (bomba manual)        |
| 7                               | Retaining valve<br>Válvula de retención                    | 16                                  | Manifold block / Bloque manifold                                        |
| 8                               | Membrane accumulator<br>Acumulador de membrana             | 17                                  | Electric connection panel<br>Tablero para conexión eléctrica            |
| 9                               | Pressure gauge / Manómetro                                 | 18                                  | Protection cabinet<br>Compartimiento de protección                      |

|                         |                                                  |                                            |                                                                |
|-------------------------|--------------------------------------------------|--------------------------------------------|----------------------------------------------------------------|
| Weight / Peso           | Retaining valve<br>Válvula de retención          | Feeding Voltage<br>Tensión de Alimentación | 220/380/440 [VAC] three-phase<br>220/380/440 [Vca] · Trifásico |
| Fluid / Fluido          | Membrane accumulator<br>Acumulador de membrana   | Motor power<br>Potencia del motor          | 3 [hp] / 3 [cv]                                                |
| Viscosity<br>Viscosidad | 3 to 5° Engler at 50° C<br>3 a 5° Engler a 50° C | Control voltage<br>Tensión de mando        | 110/220 [VAC] / 110/220 [Vca]                                  |

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## Solid Discs - 30 mm Thickness

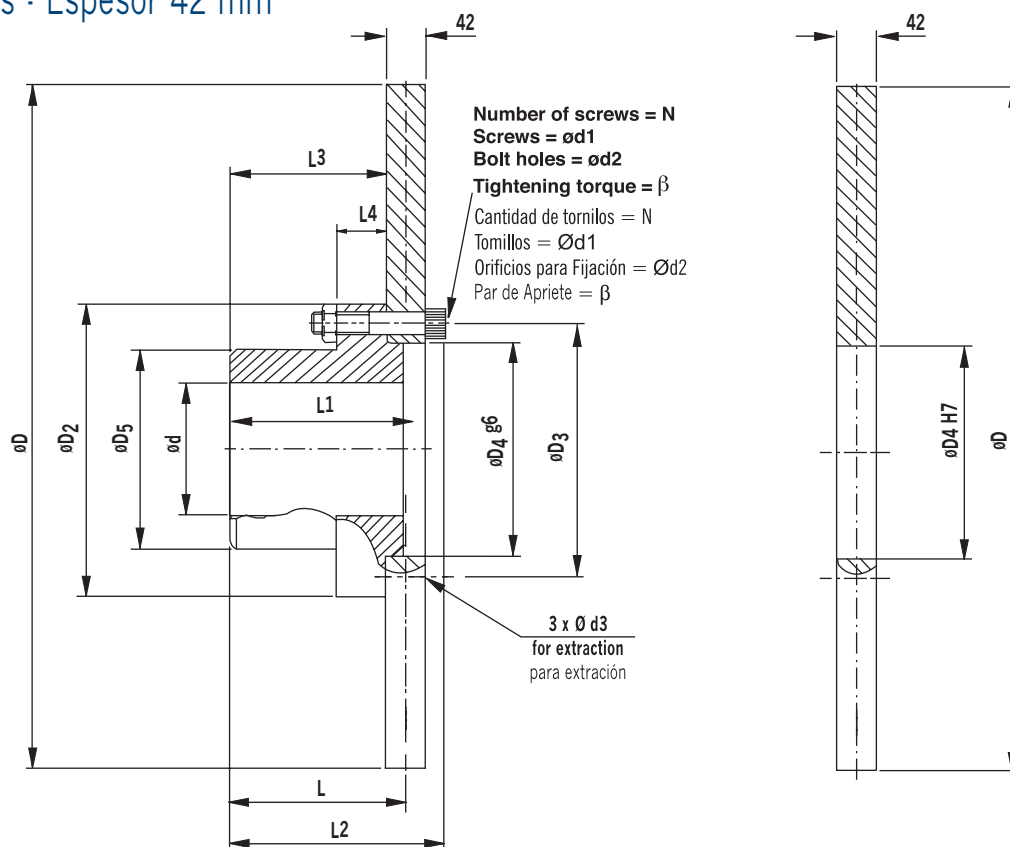
Discos Sólidos - Espesor 30 mm



| Models / Modelos                                             |                        | 175   | 220   | 260   | 315   | 355   | 395   | 445   | 495   | 550   | 625   | 705   | 795   |
|--------------------------------------------------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Inertia / J<br>[kgm <sup>2</sup> ]                           | With Hub / Con Cubo    | 0.03  | 0.06  | 0.13  | 0.27  | 0.42  | 0.64  | 1.00  | 1.59  | 2.38  | 3.95  | 6.41  | 10.25 |
|                                                              | Without Hub / Sin Cubo | -     | -     | -     | 0.26  | 0.40  | 0.61  | 0.96  | 1.48  | 2.27  | 3.81  | 6.17  | 9.83  |
| Weight / Peso<br>[kgf]                                       | With Hub / Con Cubo    | 7     | 12    | 19    | 27    | 32    | 37    | 47    | 65    | 75    | 93    | 120   | 155   |
|                                                              | Without Hub / Sin Cubo | -     | -     | -     | 21    | 24    | 27    | 33    | 40    | 50    | 66    | 84    | 106   |
| Max. Speed [rpm] / Veloc. Limite [rpm]                       |                        | 5.000 | 4.300 | 3.600 | 3.000 | 2.700 | 2.400 | 2.100 | 1.900 | 1.800 | 1.500 | 1.300 | 1.200 |
| $\varnothing D$                                              |                        | 175   | 220   | 260   | 315   | 355   | 395   | 445   | 495   | 550   | 625   | 705   | 795   |
| $\varnothing D_2$                                            |                        | -     | -     | -     | 125   | 145   | 165   | 175   | 220   | 220   | 235   | 265   | 300   |
| $\varnothing D_3$                                            |                        | -     | -     | -     | 105   | 125   | 140   | 146   | 190   | 190   | 205   | 230   | 260   |
| $\varnothing D_4$                                            |                        | -     | -     | -     | 85    | 105   | 115   | 120   | 160   | 160   | 170   | 195   | 220   |
| $\varnothing D_5$                                            |                        | 60    | 60    | 80    | 80    | 95    | 105   | 110   | 150   | 150   | 150   | 180   | 210   |
| L                                                            |                        | 55    | 65    | 85    | 102   | 102   | 102   | 135   | 135   | 135   | 135   | 135   | 135   |
| L1                                                           |                        | -     | -     | -     | 107   | 107   | 107   | 140   | 140   | 140   | 140   | 140   | 140   |
| L2                                                           |                        | 70    | 80    | 100   | 127   | 129   | 131   | 166   | 168   | 168   | 170   | 172   | 174   |
| L3                                                           |                        | -     | -     | -     | 87    | 87    | 87    | 120   | 120   | 120   | 120   | 120   | 120   |
| L4                                                           |                        | -     | -     | -     | 28    | 28    | 30    | 30    | 38    | 38    | 38    | 40    | 40    |
| N                                                            |                        | -     | -     | -     | 9     | 9     | 9     | 12    | 12    | 12    | 12    | 12    | 12    |
| $\varnothing d$                                              |                        | 0.40  | 0.40  | 0.50  | 0.50  | 0.60  | 0.70  | 0.70  | 0.100 | 0.100 | 0.100 | 0.120 | 0.130 |
| $\varnothing d_1$                                            |                        | -     | -     | -     | 10    | 12    | 14    | 16    | 18    | 18    | 20    | 22    | 24    |
| $\varnothing d_2$                                            |                        | -     | -     | -     | 11    | 13    | 15    | 17    | 19    | 19    | 21    | 23    | 25    |
| $\varnothing d_3$                                            |                        | -     | -     | -     | M10   | M12   | M14   | M16   | M18   | M18   | M20   | M22   | M24   |
| Tightening Torque $\beta$ [Nm] / Par de Apriete $\beta$ [Nm] |                        | -     | -     | -     | 50    | 90    | 140   | 210   | 290   | 290   | 410   | 550   | 710   |

## Solid Discs - 42 mm Thickness

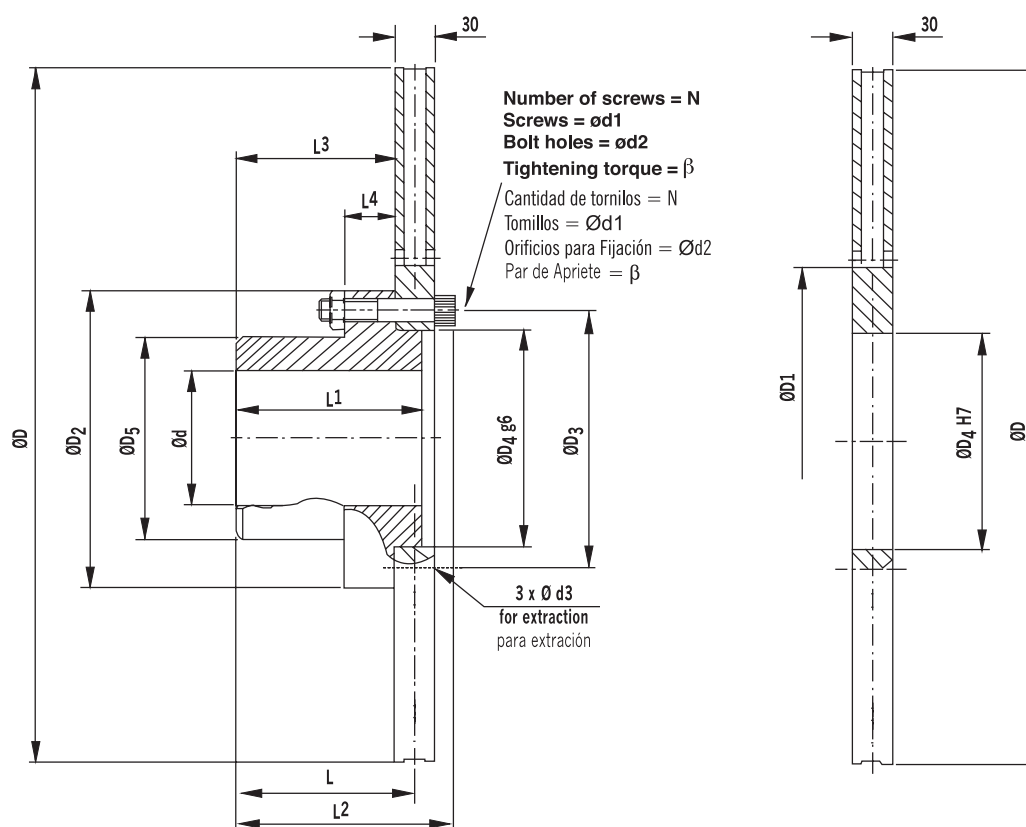
Discos Sólidos · Espesor 42 mm



| Models / Modelos                                |                        | 625 S 42     | 705 S 42     | 795 S 42     | 995 S 42   |
|-------------------------------------------------|------------------------|--------------|--------------|--------------|------------|
| Inertia / J [kgm <sup>2</sup> ]                 | With Hub / Con Cubo    | 5.74         | 9.04         | 15.05        | 35.72      |
|                                                 | Without Hub / Sin Cubo | 5.33         | 8.63         | 13.77        | 34.46      |
| Weight / Peso [kgf]                             | With Hub / Con Cubo    | 139          | 164          | 248          | 338        |
|                                                 | Without Hub / Sin Cubo | 92           | 117          | 149          | 239        |
| Max. Speed [rpm] / Veloc. Límite [rpm]          |                        | <b>1.500</b> | <b>1.300</b> | <b>1.200</b> | <b>900</b> |
| øD                                              |                        | 625          | 705          | 795          | 995        |
| øD1                                             |                        | 302          | 418          | 486          | 694        |
| øD2                                             |                        | 300          | 300          | 380          | 380        |
| øD3                                             |                        | 260          | 260          | 330          | 330        |
| øD4                                             |                        | 220          | 220          | 280          | 280        |
| øD5                                             |                        | 210          | 210          | 260          | 260        |
| L                                               |                        | 141          | 141          | 181          | 181        |
| L1                                              |                        | 140          | 140          | 180          | 180        |
| L2                                              |                        | 186          | 186          | 232          | 232        |
| L3                                              |                        | 120          | 120          | 160          | 160        |
| L4                                              |                        | 40           | 40           | 40           | 40         |
| N                                               |                        | 12           | 12           | 12           | 12         |
| ød                                              |                        | 40 · 140     | 40 · 140     | 40 · 180     | 40 · 180   |
| ød1                                             |                        | 24           | 24           | 30           | 30         |
| ød2                                             |                        | 25           | 25           | 31           | 31         |
| ød3                                             |                        | <b>M24</b>   | <b>M24</b>   | <b>M30</b>   | <b>M30</b> |
| Tightening Torque β[Nm] / Par de Apriete β [Nm] |                        | 710          | 710          | 1.450        | 1.450      |

# Self-ventilated Discs - 30 mm Thickness

## Discos Autoventilados - Espesor 30 mm

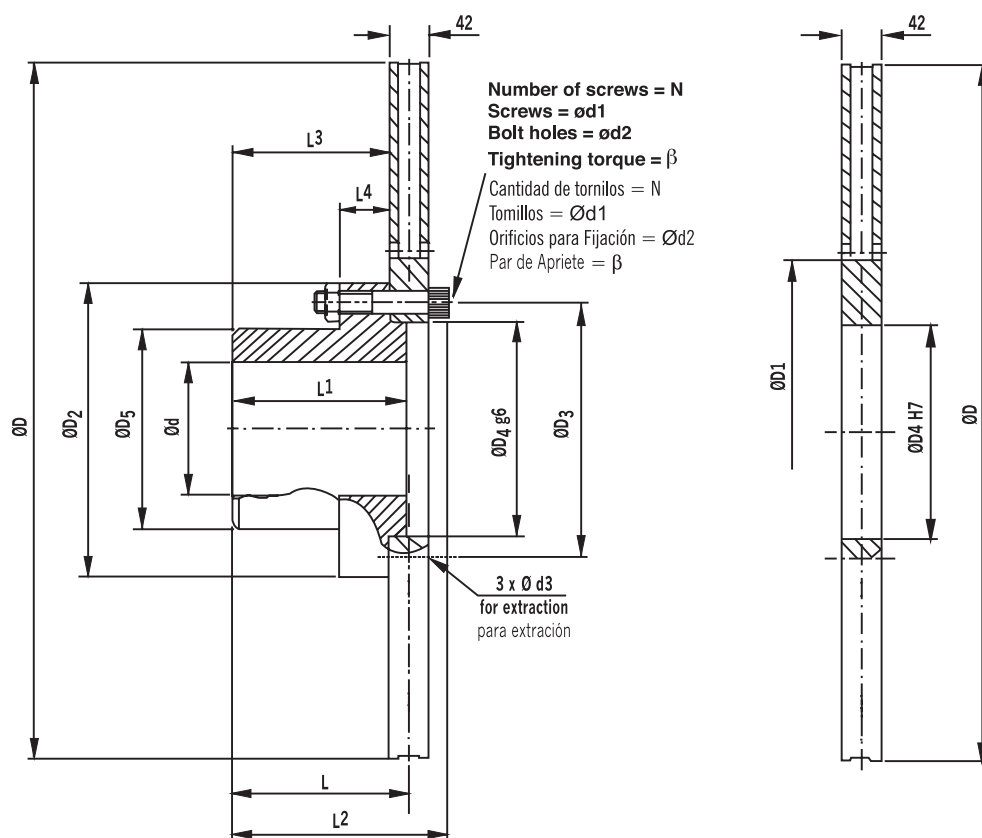


| Models / Modelos                                             |                        | 315 V 30 | 355 V 30 | 395 V 30 | 445 V 30 | 495 V 30 | 550 V 30 | 625 V 30 | 705 V 30 | 795 V 30 |
|--------------------------------------------------------------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Inertia / J [kgm <sup>2</sup> ]                              | With Hub / Con Cubo    | 0.13     | 0.22     | 0.35     | 0.54     | 0.88     | 1.29     | 2.15     | 3.56     | 6.00     |
|                                                              | Without Hub / Sin Cubo | 0.12     | 0.20     | 0.32     | 0.50     | 0.77     | 1.18     | 2.01     | 3.32     | 5.58     |
| Weight / Peso [kgf]                                          | With Hub / Con Cubo    | 16       | 21       | 27       | 34       | 49       | 56       | 69       | 92       | 122      |
|                                                              | Without Hub / Sin Cubo | 10       | 13       | 17       | 20       | 24       | 31       | 42       | 56       | 73       |
| Max. Speed [rpm] / Veloc. Limite [rpm]                       |                        | 3.000    | 2.700    | 2.400    | 2.100    | 1.900    | 1.800    | 1.500    | 1.300    | 1.200    |
| $\phi D$                                                     |                        | 315      | 355      | 395      | 445      | 495      | 550      | 625      | 705      | 795      |
| $\phi D1$                                                    |                        | 139      | 172      | 177      | 184      | 230      | 275      | 343      | 418      | 498      |
| $\phi D2$                                                    |                        | 125      | 145      | 165      | 175      | 220      | 220      | 235      | 265      | 300      |
| $\phi D3$                                                    |                        | 105      | 125      | 140      | 146      | 190      | 190      | 205      | 230      | 260      |
| $\phi D4$                                                    |                        | 85       | 105      | 115      | 120      | 160      | 160      | 170      | 195      | 220      |
| $\phi D5$                                                    |                        | 80       | 95       | 105      | 110      | 150      | 150      | 150      | 180      | 210      |
| L                                                            |                        | 102      | 102      | 102      | 135      | 135      | 135      | 135      | 135      | 135      |
| L1                                                           |                        | 107      | 107      | 107      | 140      | 140      | 140      | 140      | 140      | 140      |
| L3                                                           |                        | 127      | 129      | 131      | 166      | 168      | 168      | 170      | 172      | 174      |
| L4                                                           |                        | 87       | 87       | 87       | 120      | 120      | 120      | 120      | 120      | 120      |
| N                                                            |                        | 28       | 28       | 28       | 30       | 38       | 38       | 38       | 40       | 40       |
| $\phi d$                                                     |                        | 9        | 9        | 9        | 12       | 12       | 12       | 12       | 12       | 12       |
| $\phi d1$                                                    |                        | 0.50     | 0.60     | 0.70     | 0.70     | 0.100    | 0.100    | 0.100    | 0.120    | 0.130    |
| $\phi d2$                                                    |                        | 10       | 12       | 14       | 16       | 18       | 18       | 20       | 22       | 24       |
| $\phi d3$                                                    |                        | 11       | 13       | 15       | 17       | 19       | 19       | 21       | 23       | 25       |
| Tightening Torque $\beta$ [Nm] / Par de Apriete $\beta$ [Nm] |                        | M10      | M12      | M14      | M16      | M18      | M18      | M20      | M22      | M24      |
|                                                              |                        | 50       |          | 140      | 210      | 290      | 290      | 410      | 550      | 710      |



## Self-ventilated Discs - 42 mm Thickness

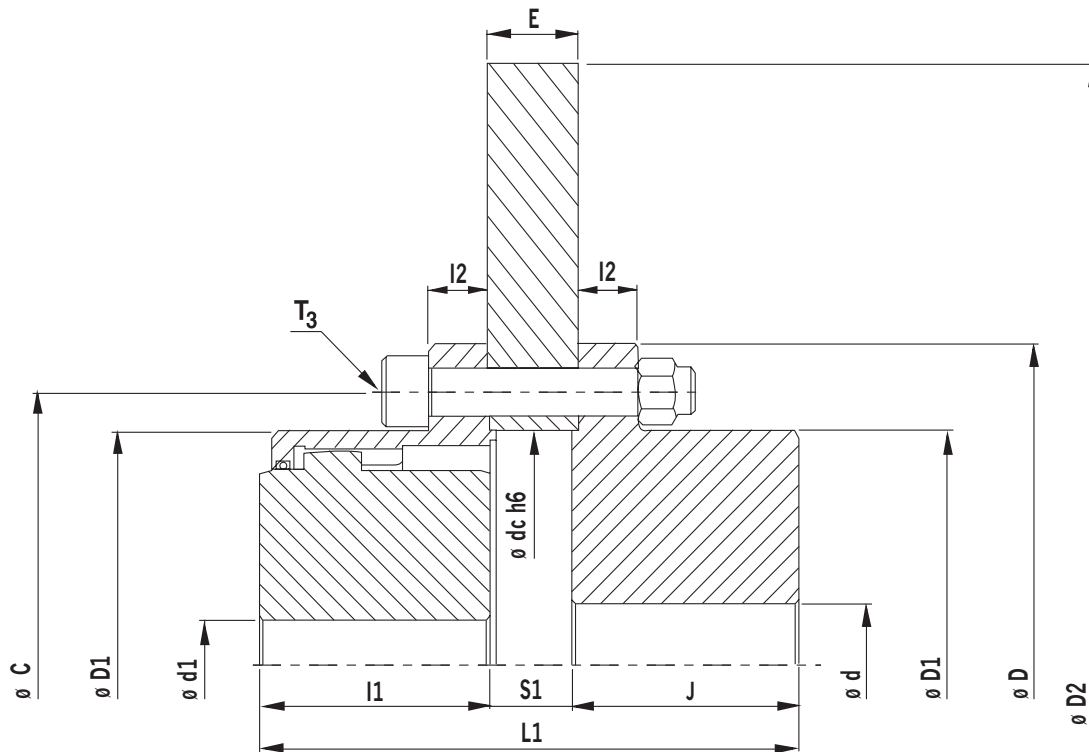
Discos Autoventilados - Espesor 42 mm



| Models / Modelos                                             |                        | 625 V 42 | 705 V 42 | 795 V 42 | 995 V 42 |
|--------------------------------------------------------------|------------------------|----------|----------|----------|----------|
| Inertia / J [kgm <sup>2</sup> ]                              | With Hub / Con Cubo    | 3.77     | 6.05     | 10.45    | 25.63    |
|                                                              | Without Hub / Sin Cubo | 3.36     | 5.64     | 9.19     | 24.37    |
| Weight / Peso [kgf]                                          | With Hub / Con Cubo    | 107      | 132      | 204      | 286      |
|                                                              | Without Hub / Sin Cubo | 60       | 85       | 105      | 187      |
| Max. Speed [rpm] / Veloc. Límite [rpm]                       |                        | 1.500    | 1.300    | 1.200    | 900      |
| $\varnothing D$                                              |                        | 625      | 705      | 795      | 995      |
| $\varnothing D1$                                             |                        | 302      | 418      | 486      | 694      |
| $\varnothing D2$                                             |                        | 300      | 300      | 380      | 380      |
| $\varnothing D3$                                             |                        | 260      | 260      | 330      | 330      |
| $\varnothing D4$                                             |                        | 220      | 220      | 280      | 280      |
| $\varnothing D5$                                             |                        | 210      | 210      | 260      | 260      |
| L                                                            |                        | 141      | 141      | 181      | 181      |
| L1                                                           |                        | 140      | 140      | 180      | 180      |
| L2                                                           |                        | 186      | 186      | 232      | 232      |
| L3                                                           |                        | 120      | 120      | 160      | 160      |
| L4                                                           |                        | 40       | 40       | 40       | 40       |
| N                                                            |                        | 12       | 12       | 12       | 12       |
| $\varnothing d$                                              |                        | 40 · 140 | 40 · 140 | 40 · 180 | 40 · 180 |
| $\varnothing d1$                                             |                        | 24       | 24       | 30       | 30       |
| $\varnothing d2$                                             |                        | 25       | 25       | 31       | 31       |
| $\varnothing d3$                                             |                        | M24      | M24      | M30      | M30      |
| Tightening Torque $\beta$ [Nm] / Par de Apriete $\beta$ [Nm] |                        | 710      | 710      | 1.450    | 1.450    |

## Gear Couplings With Discs - RFTB

### Acoplamiento de Engranajes Con Discos – RFTB



| Modelos<br>Modelos | Max. [Nm]<br>M.Max. [Nm] | Max. n<br>[rpm] | L1    | I1    | J     | I2   | S1   | D   | D1  | D2             | d1<br>min | d-a | d1-a | dc  | C     | T <sub>3</sub> | M     | MA  |
|--------------------|--------------------------|-----------------|-------|-------|-------|------|------|-----|-----|----------------|-----------|-----|------|-----|-------|----------------|-------|-----|
| NVD160RFTB00       | 90.500                   | 8.000           | 105,0 | 38    | 35    | 14   | 32   | 116 | 75  | 795 (to/a) 995 | 12        | 55  | 44   | 77  | 90,5  | 6              | 5/16" | 32  |
| NVD140RFTB00       | 31.000                   | 6.500           | 125,3 | 49,5  | 46    | 17   | 29,8 | 152 | 105 | 625 (to/a) 995 | 18        | 80  | 65   | 105 | 122,2 | 8              | 3/8"  | 55  |
| NVD145RFTB00       | 42.000                   | 5.600           | 150,5 | 62    | 58,5  | 17,5 | 30   | 178 | 126 | 315 (to/a) 625 | 25        | 96  | 77   | 128 | 149,2 | 6              | 1/2"  | 130 |
| NVD170RFTB00       | 140.000                  | 5.000           | 158,0 | 77    | 73,5  | 20   | 30   | 213 | 155 | 550 (to/a) 995 | 30        | 121 | 100  | 156 | 181   | 6              | 5/8"  | 200 |
| NVD150RFTB00       | 56.600                   | 4.400           | 209,0 | 91    | 88    | 20   | 30   | 240 | 180 | 705 (to/a) 995 | 35        | 141 | 119  | 180 | 206,4 | 8              | 5/8"  | 200 |
| NVD155RFTB00       | 85.000                   | 3.900           | 239,6 | 106,5 | 102   | 26   | 31,6 | 280 | 211 | 795 (to/a) 995 | 50        | 168 | 132  | 208 | 241,3 | 8              | 3/4"  | 340 |
| NVD130RFTB00       | 12.100                   | 3.600           | 268,6 | 120,5 | 115,5 | 26   | 31,6 | 318 | 245 | 625 (to/a) 995 | 50        | 197 | 164  | 243 | 279,4 | 8              | 3/4"  | 340 |
| NVD135RFTB00       | 18.500                   | 3.200           | 298,6 | 135   | 130,5 | 26   | 33,6 | 346 | 274 | 705 (to/a) 995 | 50        | 222 | 182  | 268 | 304,8 | 10             | 3/4"  | 500 |
| NVD120RFTB00       | 4.250                    | 2.900           | 332,8 | 153   | 147,5 | 35   | 32,8 | 390 | 306 | 355 (to/a) 625 | 50        | 250 | 200  | 300 | 342,9 | 8              | 7/8"  | 500 |
| NVD125RFTB00       | 7.500                    | 2.650           | 373,8 | 168   | 173   | 35   | 32,8 | 425 | 334 | 445 (to/a) 795 | 50        | 276 | 225  | 325 | 368,3 | 14             | 7/8"  | 500 |
| NVD110RFTB00       | 1.000                    | 2.450           | 410,2 | 188   | 186,5 | 23   | 35,7 | 457 | 366 | 495 (to/a) 795 | 50        | 298 | 238  | 364 | 400   | 14             | 7/8"  | 500 |
| NVD115RFTB00       | 2.200                    | 2.150           | 478,0 | 221   | 220   | 25,5 | 37   | 527 | 425 | 495 (to/a) 795 | 50        | 353 | 290  | 415 | 463,6 | 16             | 1"    | 500 |

#### NOTES:

**T<sub>3</sub>** - quantity-spaced screws

**M** - recommended thread size and type (UNC)

**MA** - screw tightening torque in [Nm]

**L1** and **S1** - defined for 30-mm thick braking disc

**E** - variable according to application

**d1** - min pilot holes to be provided for both hub diameters

**d1 - a** - maximum diameter for DIN 6885/1 keyway

**d1 - b** - maximum diameter for rectangular AGMA 9002 key

**d1 - c** - maximum diameter for square AGMA 9002 key

**dc** - brake disc centering diameter with tolerance

#### OBSERVACIONES:

**T<sub>3</sub>** - es la cantidad de tornillos igualmente espaciados

**M** - representa el tamaño y el tipo de rosca recomendada (UNC)

**MA** - es el torque de apriete de los tornillos en [Nm]

**L1** y **S1** - definidos para disco de freno de 30 mm de espesor

**E** - variable según la aplicación.

**d1** - min orificios pilotos a suministrarse para ambos cubos diámetro

**d1 - a** - diámetro máximo para clavija DIN 6885/1

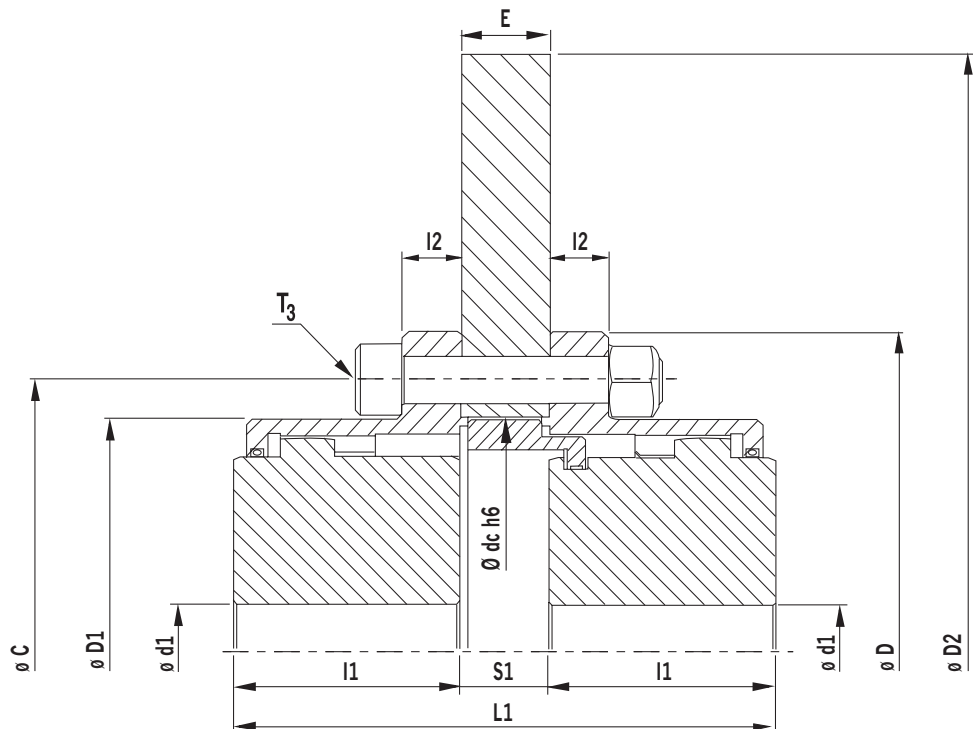
**d1 - b** - diámetro máximo para clavija AGMA 9002 rectangular

**d1 - c** - diámetro máximo para clavija AGMA 9002 cuadrada

**dc** - Ødiámetro de centrage do disco de freio con tolerância

## Flexible Gear Couplings with Discs - FFTB

### Acoplamiento Elástico con Discos Rectos – FFTB



| Modelos<br>Modelos | Max. [Nm]<br>M.Max. [Nm] | Max. n<br>[rpm] | L1    | L2    | I2   | S1   | D   | D1  | D2             | d1<br>min | d1-a | d1-b | d1-c | dc  | C     | T <sub>3</sub> | M     | MA  |
|--------------------|--------------------------|-----------------|-------|-------|------|------|-----|-----|----------------|-----------|------|------|------|-----|-------|----------------|-------|-----|
| NVD110FFTB00       | 1.000                    | 8.000           | 107   | 38    | 14   | 31   | 116 | 75  | 315 (to/a) 625 | 12        | 44   | 44   | 40   | 77  | 90,5  | 6              | 5/16" | 32  |
| NVD115FFTB00       | 2.200                    | 6.500           | 127,8 | 49,5  | 17   | 28,8 | 152 | 105 | 355 (to/a) 625 | 18        | 65   | 65   | 60   | 105 | 122,2 | 8              | 3/8"  | 55  |
| NVD120FFTB00       | 4.250                    | 5.600           | 153   | 62    | 17,5 | 29   | 178 | 126 | 445 (to/a) 795 | 25        | 77   | 78   | 70   | 128 | 149,2 | 6              | 1/2"  | 130 |
| NVD125FFTB00       | 7.500                    | 5.000           | 184   | 77    | 20   | 30   | 213 | 155 | 495 (to/a) 795 | 30        | 100  | 98   | 90   | 156 | 181   | 6              | 5/8"  | 200 |
| NVD130FFTB00       | 12.100                   | 4.400           | 212   | 91    | 20   | 30   | 240 | 180 | 495 (to/a) 795 | 35        | 119  | 112  | 105  | 180 | 206,4 | 8              | 5/8"  | 200 |
| NVD135FFTB00       | 18.500                   | 3.900           | 244,6 | 106,5 | 26   | 31,6 | 280 | 211 | 550 (to/a) 995 | 50        | 132  | 130  | 117  | 208 | 241,3 | 8              | 3/4"  | 340 |
| NVD140FFTB00       | 31.000                   | 3.600           | 272,6 | 120,5 | 26   | 32,6 | 318 | 245 | 625 (to/a) 995 | 50        | 164  | 160  | 143  | 243 | 279,4 | 8              | 3/4"  | 340 |
| NVD145FFTB00       | 42.000                   | 3.200           | 303,6 | 135   | 26   | 33,6 | 346 | 274 | 625 (to/a) 995 | 50        | 182  | 172  | 160  | 268 | 304,8 | 10             | 3/4"  | 340 |
| NVD150FFTB00       | 56.600                   | 2.900           | 337,8 | 153   | 35   | 31,8 | 390 | 306 | 705 (to/a) 995 | 50        | 200  | 188  | 174  | 300 | 342,9 | 8              | 7/8"  | 500 |
| NVD155FFTB00       | 85.000                   | 2.650           | 367,8 | 168   | 35   | 31,8 | 425 | 334 | 705 (to/a) 995 | 50        | 225  | 215  | 195  | 325 | 368,3 | 14             | 7/8"  | 500 |
| NVD160FFTB00       | 90.500                   | 2.450           | 409,2 | 188   | 23   | 33,2 | 457 | 366 | 795 (to/a) 995 | 50        | 238  | 225  | 212  | 364 | 400   | 14             | 7/8"  | 500 |
| NVD170FFTB00       | 140.000                  | 2.150           | 476   | 221   | 25,5 | 34   | 527 | 425 | 795 (to/a) 995 | 50        | 290  | 270  | 250  | 415 | 463,6 | 16             | 1"    | 500 |

#### NOTES:

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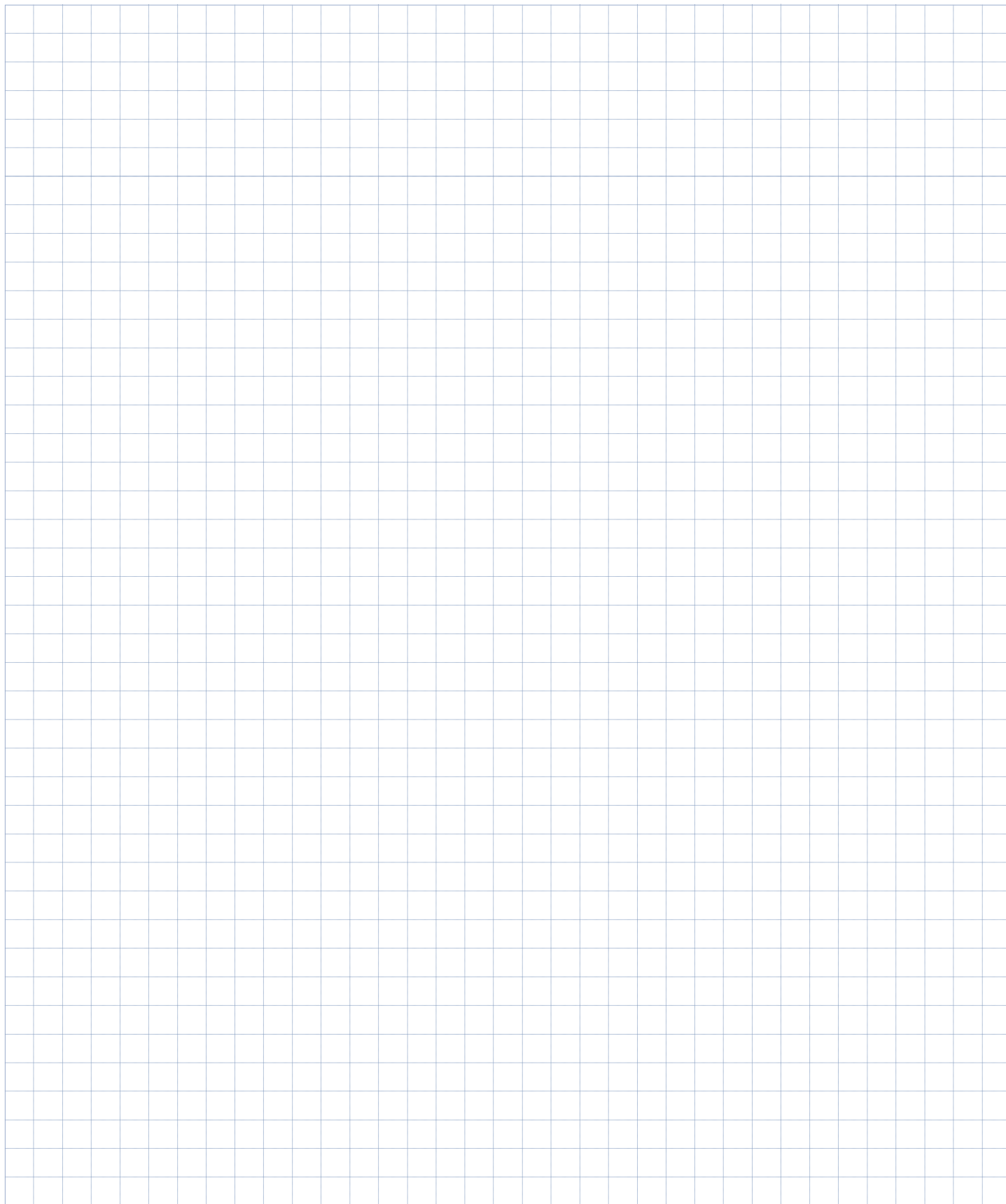
**d1 - b** - diámetro máximo para clavija AGMA 9002 rectangular

**d1 - c** - diámetro máximo para clavija AGMA 9002 cuadrada

**dc** - diámetro de centrado de disco de freno con tolerancia

## Notice

### Notas







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