# Additional Date/Spec Sheet

Group 3 XV-3M Vivoil Vivolo Aluminium Gear Motor – Reversible – External Drainage
XM302 Series Standard European Motor Ø50.8 Flange – Taper Shaft

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INTRODUCTION **XV-3M**

XM302

STANDARD EUROPEAN MOTOR
ø50.8 FLANGE - TAPER SHAFT

**Summary: Displacements - Torque - Power - Pressures - Speeds**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| XV-3M/21 | 21.10 cm³/rev | 28,54 Nm | 2,99 KW | 300 bar | 6 bar | 15 bar | 700 rev/min | 3000 rev/min |
| XV-3M/27 | 26.97 cm³/rev | 36,49 Nm | 3,82 KW | 270 bar | 6 bar | 10 bar | 700 rev/min | 3000 rev/min |
| XV-3M/32 | 32.27 cm³/rev | 43,66 Nm | 4,57 KW | 270 bar | 6 bar | 10 bar | 700 rev/min | 3000 rev/min |
| XV-3M/38 | 38.47 cm³/rev | 52,04 Nm | 5,45 KW | 270 bar | 6 bar | 10 bar | 700 rev/min | 2800 rev/min |
| XV-3M/43 | 43.44 cm³/rev | 58,77 Nm | 6,15 KW | 250 bar | 6 bar | 10 bar | 700 rev/min | 2800 rev/min |
| XV-3M/47 | 47.16 cm³/rev | 63,80 Nm | 6,68 KW | 250 bar | 6 bar | 10 bar | 700 rev/min | 2800 rev/min |
| XV-3M/51 | 50.88 cm³/rev | 68,83 Nm | 7,21 KW | 250 bar | 6 bar | 10 bar | 700 rev/min | 2800 rev/min |
| XV-3M/54 | 54.60 cm³/rev | 73,86 Nm | 7,74 KW | 250 bar | 6 bar | 10 bar | 700 rev/min | 2300 rev/min |
| XV-3M/61 | 60.81 cm³/rev | 82,26 Nm | 8,61 KW | 220 bar | 6 bar | 10 bar | 700 rev/min | 2300 rev/min |
| XV-3M/64 | 64.53 cm³/rev | 87,30 Nm | 9,14 KW | 220 bar | 6 bar | 10 bar | 700 rev/min | 2300 rev/min |
| XV-3M/70 | 70.74 cm³/rev | 95,70 Nm | 10,02 KW | 210 bar | 6 bar | 10 bar | 700 rev/min | 2300 rev/min |
| XV-3M/74 | 74.46 cm³/rev | 100,73 Nm | 10,55 KW | 190 bar | 6 bar | 10 bar | 700 rev/min | 2300 rev/min |

## General technical data

| | |
|---|---|
| Type of fluid to be used | Mineral-based hydraulic oil HLP HV (D IN 51524) |
| Minimum operating viscosity | 10 mm²/s |
| Maximum operating viscosity | 100 mm²/s |
| Maximum admissible viscosity at start-up | 1500 mm²/s |
| Recommended viscosity | 20 mm²/s - 100 mm²/s |
| Ambient temperature | -20 ℃ - 60℃ |
| Fluid operating temperature | -15℃ - 80℃ |
| Recommended fluid operating temperature | 30℃ – 50° C |
| For temperatures above 120℃ | Request FKM seals ( V iton) |
| Max. outlet fluid pressure (OUT) | 0.3 - 0.5 bars (with internal drainage) |
| Inlet fluid filtering (IN) | 30 - 60 Microns |
| Outlet fluid filtering (OUT) | 10 - 25 Microns |
| Max. inlet fluid speed (IN) | 0.5 - 1.5 m/s |
| Max. outlet fluid speed (OUT) | 3.0 - 5.5m/s |

External
drainage
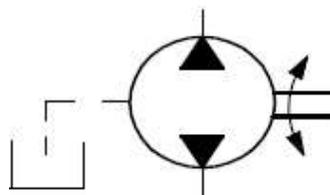
| TYPE | cm3/rev | rpm | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 700 | 1000 | 1500 | 2000 | 2300 | 2500 | 3000 |
| XV 3M/15 | 14,89 | 9,90 | 14,15 | 21,22 | 28,29 | 32,54 | 35,37 | 42,44 |
| XV 3M/18 | 17,37 | 11,55 | 16,51 | 24,76 | 33,01 | 37,96 | 41,26 | 49,52 |
| XV 3M/21 | 21,10 | 14,03 | 20,04 | 30,06 | 40,08 | 46,10 | 50,11 | 60,13 |
| XV 3M/27 | 26,97 | 17,94 | 25,62 | 38,43 | 51,24 | 58,93 | 64,05 | 76,86 |
| XV 3M/32 | 32,27 | 21,46 | 30,65 | 45,98 | 61,31 | 70,50 | 76,63 | 91,96 |
| XV 3M/38 | 38,47 | 25,58 | 36,55 | 54,82 | 73,09 | 84,06 | 91,37 | |
| XV 3M/43 | 43,44 | 28,88 | 41,26 | 61,89 | 82,53 | 94,91 | 103,16 | |
| XV 3M/47 | 47,16 | 31,36 | 44,80 | 67,20 | 89,60 | 103,04 | 112,00 | |
| XV 3M/51 | 50,88 | 33,84 | 48,34 | 72,51 | 96,67 | 111,17 | | |
| XV 3M/54 | 54,60 | 36,31 | 51,87 | 77,81 | 103,75 | 119,31 | | |
| XV 3M/61 | 60,81 | 40,44 | 57,77 | 86,65 | 115,54 | 132,87 | | |
| XV 3M/64 | 64,53 | 42,91 | 61,31 | 91,96 | 122,61 | 141,00 | | |
| XV 3M/70 | 70,74 | 47,04 | 67,20 | 100,80 | 134,40 | 154,56 | | |
| XV 3M/74 | 74,46 | 49,52 | 70,74 | 106,11 | 141,47 | 162,70 | | |
| XV 3M/90 | 86,87 | 57,77 | 82,53 | 123,79 | 165,05 | 189,81 | | |

(Flow rate l/min)

## TORQUES ALLOWED ON SHAFT:

| FORMULA FOR EVALUATING SHAFT | SHAFT [IDENTIFIER] - CODE - DESCRIPTION | T.2 [Nm] |
|---|---|---|
| $$T.2 \le \frac{vi \times \Delta p \times \eta m}{20 \times \pi}$$ **XV-3M** | [A] - CO001 - Tapered 1:8 - ø22 – M14x1.5 - key thk.4 | 482 |

**T.2** = max. torque allowed by shaft [ Nm]
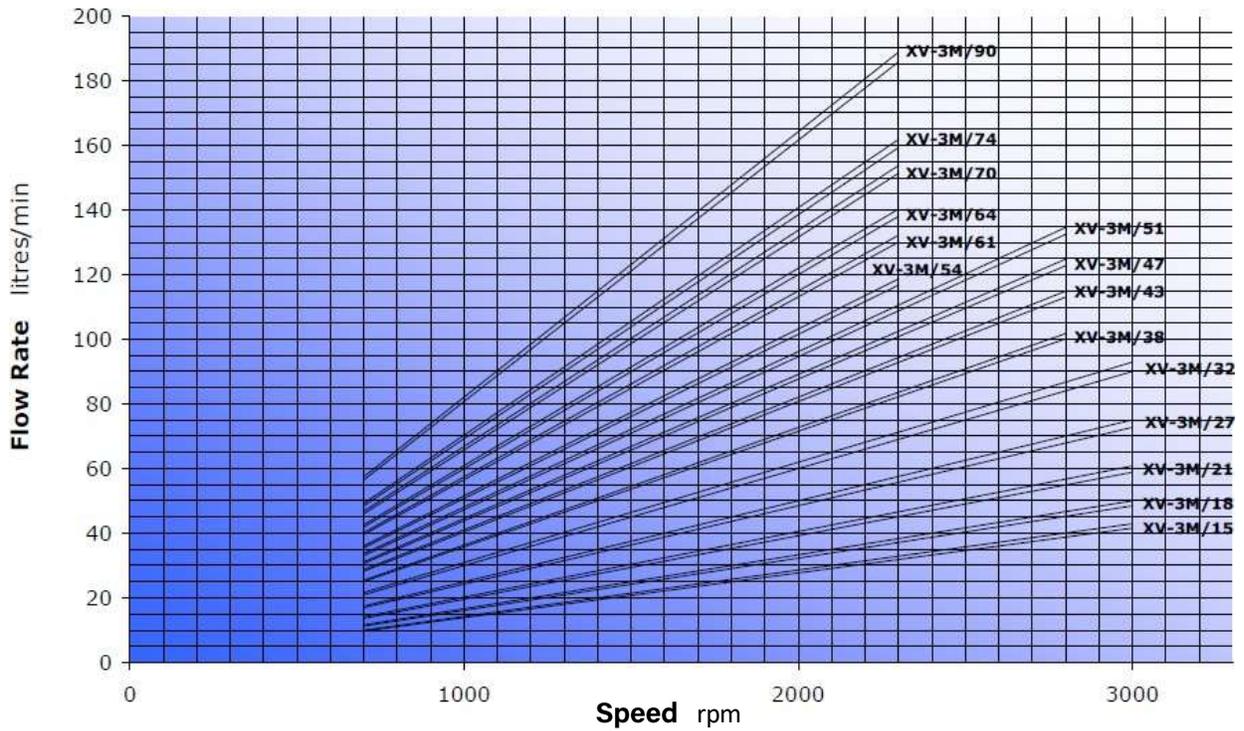
## Useful calculation formulas

| SYMBOL, | UNIT OF MEASUREMENT, | DESCRIPTION |
|---|---|---|
| qv | l/min | Flow rate |
| vi | cm$^3$/rev. | Displacement (volume of oil displaced per complete revolution of the shaft) |
| n | rpm | Shaft rotation speed |
| p1 | bar | inlet pressure |
| p2 | bar | outlet pressure |
| $\Delta$p | bar | $\Delta p = p2 - p1$ difference between outlet (OUT) and inlet (IN) pressure |
| Ph | kW | Hydraulic power delivered |
| Pm | kW | Mechanical power absorbed |
| T | Nm | Torque absorbed by shaft |
| $\eta v$ | - | 0.91 – 0.96 volumetric efficiency (volumetric ratio between operation under load and loadless operation) |
| $\eta m$ | - | 0.85 – 0.90 mechanical efficiency |
| $\eta t$ | - | $\eta t = \eta v \times \eta m$ total efficiency |

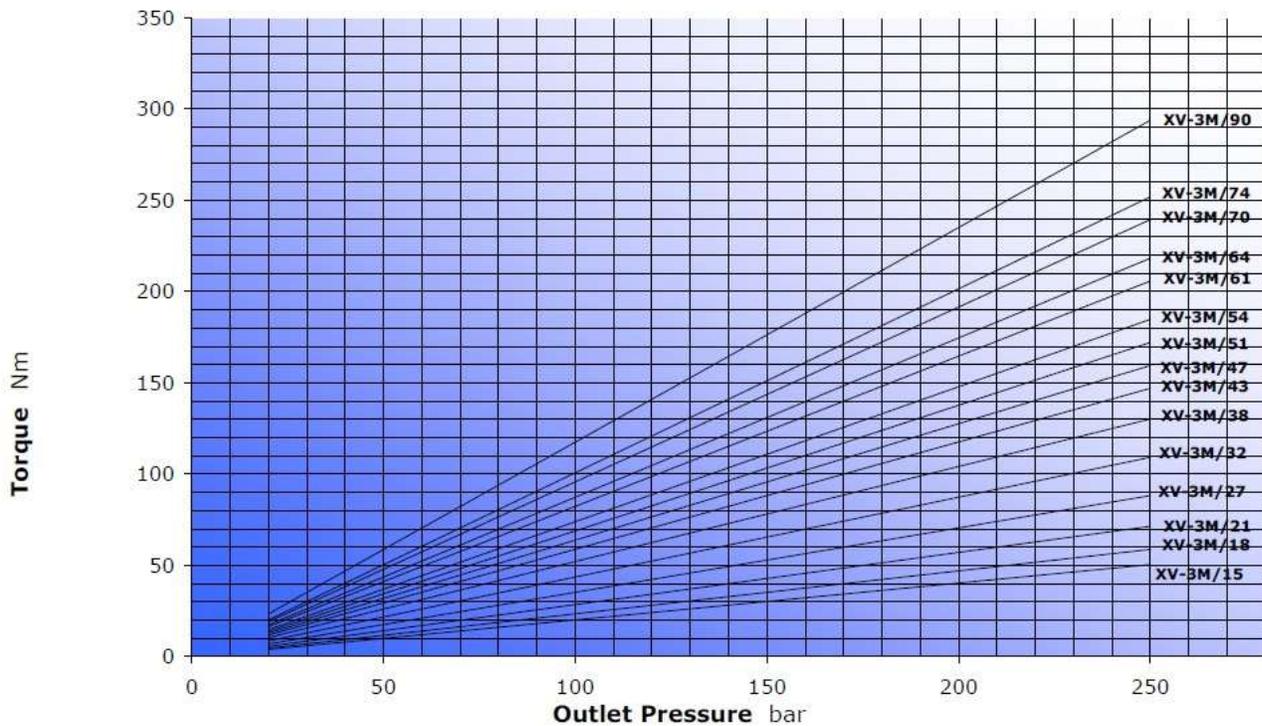| Basic Formulas | Derived Formulas | |
|---|---|---|
| $qv = \dfrac{vi \times n}{1000} \times \eta v$ | $vi = \dfrac{qv \times 1000}{n \times \eta v}$ | $n = \dfrac{qv \times 1000}{vi \times \eta v}$ |
| $T = \dfrac{vi \times \Delta p \times \eta m}{20 \times \pi}$ | $vi = \dfrac{T \times 20 \times \pi}{\Delta p \times \eta m}$ | $\Delta p = \dfrac{T \times 20 \times \pi}{vi \times \eta m}$ |
| $Ph = \dfrac{qv \times \Delta p}{600}$ | $qv = \dfrac{Ph \times 600}{\Delta p}$ | $\Delta p = \dfrac{Ph \times 600}{qv}$ |
| $Pm = \dfrac{vi \times \Delta p \times n \times \eta m}{600000}$ | $vi = \dfrac{Pm \times 600000}{\Delta p \times n \times \eta m}$ | $\Delta p = \dfrac{600000 \times \eta m}{vi \times n \times \eta m}$ |

## Constructive features

| PART | MATERIAL | MECHANICAL FEATURES |
|---|---|---|
| MOTOR BODY | Extruded alloy Series 7000, heat treated and anodised | Rp = 345 N/mm$^2$ (Yield strength)<br>Rm = 382 N/mm$^2$ (Breaking strength) |
| FLANGE AND COVER | Die-cast aluminium alloy with excellent mechanical features, heat treated and anodised | Rp = 310÷350 N/mm$^2$ (Yield strength)<br>Rm = 350÷400 N/mm$^2$ (Breaking strength) |
| GEAR BUSH BEARINGS | Special heat-treated tin alloy with excellent mechanical features and high anti-friction capacity.<br>Self-lubricating bushes DU | Rp = 350 N/mm$^2$ (Yield strength)<br>Rm = 390 N/mm$^2$ (Breaking strength) |
| GEARS | Steel UNI 7846 | Rs = 980 N/mm$^2$ (Yield strength)<br>Rm =1270÷1570 N/mm$^2$ (Breaking strength) |
| SEALS | A 727 Standard Acrylonitrile<br>F 975 Viton FKM | 70 Shore, thermal resistance 120℃<br>80 Shore, thermal resistance 200℃ |
| BACK-UP RINGS | Virgin PTFE<br>Tecnil Q3 | |

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## XV-3M CHARACTERISTIC FLOW RATE CURVES



*Flow Rate litres/min vs Speed rpm — curves labelled XV-3M/90, XV-3M/74, XV-3M/70, XV-3M/64, XV-3M/61, XV-3M/54, XV-3M/51, XV-3M/47, XV-3M/43, XV-3M/38, XV-3M/32, XV-3M/27, XV-3M/21, XV-3M/18, XV-3M/15*

## XV-3M MOTOR TORQUE



*Torque Nm vs Outlet Pressure bar — curves labelled XV-3M/90, XV-3M/74, XV-3M/70, XV-3M/64, XV-3M/61, XV-3M/54, XV-3M/51, XV-3M/47, XV-3M/43, XV-3M/38, XV-3M/32, XV-3M/27, XV-3M/21, XV-3M/18, XV-3M/15*

| X | 3 | M | 78 | 01 | A | E | E | E |
|---|---|---|----|----|---|---|---|---|

| | | | |
|---|---|---|---|
| Series | X | | series XV |
| Group | 3 | | group 3 |
| Category | M | | reversible motor |
| Displacement | 78 | | 38 |
| Flange | 01 | | Ø50.8 reversible rotation |
| Shaft | A | | CO001 - Tapered 1:8 - ø22 - key thk.4 |
| Body | IN | E | inlet - 1" BSP |
| | OUT | E | outlet - 1" BSP |
| Cover | | E | with external drainage |

XM302

## Technical data table

| TYPE | Displacement | Max. Pressure | | CODE | | | | | | | | | | | | | | | |
|------|--------------|---------------|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | cm3/rev | P1 bar | P3 bar | External drainage | | | | | | | Internal drainage | | | | | | | | |
| XV-3M/21 | 21,10 | 250 | 270 | X | 3 | P | 70 | 01 | A | D | D | E | X | 3 | P | 70 | 02 | A | D | D | F |
| XV-3M/27 | 26,97 | 250 | 270 | X | 3 | P | 72 | 01 | A | E | E | E | X | 3 | P | 72 | 02 | A | E | E | F |
| XV-3M/32 | 32,27 | 250 | 270 | X | 3 | P | 74 | 01 | A | E | E | E | X | 3 | P | 74 | 02 | A | E | E | F |
| XV-3M/38 | 38,47 | 250 | 270 | X | 3 | P | 78 | 01 | A | E | E | E | X | 3 | P | 78 | 02 | A | E | E | F |
| XV-3M/43 | 43,44 | 250 | 270 | X | 3 | P | 79 | 01 | A | E | E | E | X | 3 | P | 79 | 02 | A | E | E | F |
| XV-3M/47 | 47,16 | 230 | 250 | X | 3 | P | 80 | 01 | A | E | E | E | X | 3 | P | 80 | 02 | A | E | E | F |
| XV-3M/51 | 50,88 | 230 | 250 | X | 3 | P | 81 | 01 | A | E | E | E | X | 3 | P | 81 | 02 | A | E | E | F |
| XV-3M/54 | 54,60 | 230 | 250 | X | 3 | P | 82 | 01 | A | E | E | E | X | 3 | P | 82 | 02 | A | E | E | F |
| XV-3M/61 | 60,81 | 230 | 250 | X | 3 | P | 83 | 01 | A | F | F | E | X | 3 | P | 83 | 02 | A | F | F | F |
| XV-3M/64 | 64,53 | 210 | 230 | X | 3 | P | 85 | 01 | A | F | F | E | X | 3 | P | 85 | 02 | A | F | F | F |
| XV-3M/70 | 70,74 | 200 | 220 | X | 3 | P | 86 | 01 | A | F | F | E | X | 3 | P | 86 | 02 | A | F | F | F |
| XV-3M/74 | 74,46 | 180 | 200 | X | 3 | P | 87 | 01 | A | F | F | E | X | 3 | P | 87 | 02 | A | F | F | F |

## Dimension Drawing
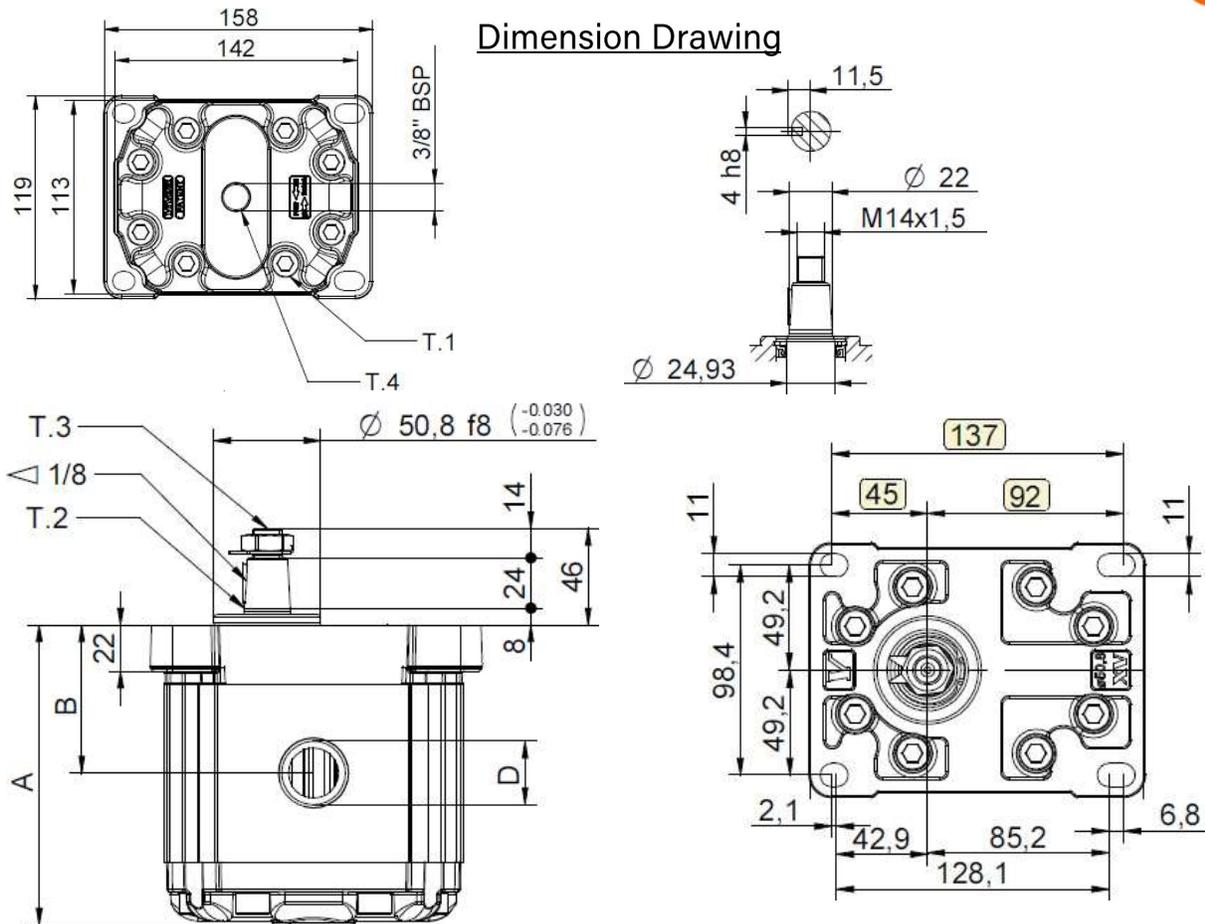
| Dimensions table | | | | | |
|---|---|---|---|---|---|
| TYPE | Weight | A | B | D | D |
| | kg | mm | mm | IN | OUT |
| XV-3M/21 | 7,150 | 127,0 | 63,5 | 3/4" BSPP | 3/4" BSPP |
| XV-3M/27 | 7,250 | 131,0 | 65,5 | 1" BSPP | 1" BSPP |
| XV-3M/32 | 7,390 | 136,0 | 68,0 | 1" BSPP | 1" BSPP |
| XV-3M/38 | 7,520 | 141,0 | 70,5 | 1" BSPP | 1" BSPP |
| XV-3M/43 | 7,630 | 145,0 | 72,5 | 1" BSPP | 1" BSPP |
| XV-3M/47 | 7,710 | 148,0 | 74,0 | 1" BSPP | 1" BSPP |
| XV-3M/51 | 7,790 | 151,0 | 75,5 | 1" BSPP | 1" BSPP |
| XV-3M/54 | 7,870 | 154,0 | 77,0 | 1" BSPP | 1" BSPP |
| XV-3M/61 | 8,010 | 159,0 | 79,5 | 1" 1/4 BSPP | 1" 1/4 BSPP |
| XV-3M/64 | 8,090 | 162,0 | 81,0 | 1" 1/4 BSPP | 1" 1/4 BSPP |
| XV-3M/70 | 8,220 | 167,0 | 83,5 | 1" 1/4 BSPP | 1" 1/4 BSPP |
| XV-3M/74 | 8,300 | 170,0 | 85,0 | 1" 1/4 BSPP | 1" 1/4 BSPP |

T.1 = 60÷65 [Nm] - screw tightening torque M10         T.3 = 75 [Nm] - torque wrench setting 22

T.2 = 482 [Nm] - admissible shaft torque (N.B. When choosing a shaft, always check the admissible torque).
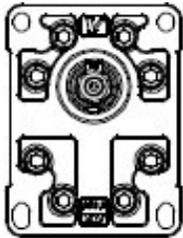
**T.4 = 0.3÷0,5 bar - max. drainage pressure**
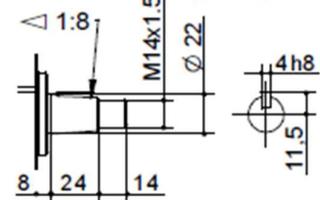
## Table of variations

ø50.8 FLANGE

### ø50.8 FLANGE

| | 01 |
|---|---|

### Shaft

**CO001 - Tapered**

T.2 = 482 [Nm]

◁ 1:8

M14x1.5

Ø 22

4 h8

11.5

8  24  14

A

### Displacement

| TYPE | CODE |
|---|---|
| XV-3M/15 | **66** |
| XV-3M/18 | **68** |
| XV-3M/21 | **70** |
| XV-3M/27 | **72** |
| XV-3M/32 | **74** |
| XV-3M/38 | **78** |
| XV-3M/43 | **79** |
| XV-3M/47 | **80** |
| XV-3M/51 | **81** |
| XV-3M/54 | **82** |
| XV-3M/61 | **83** |
| XV-3M/64 | **85** |
| XV-3M/70 | **86** |
| XV-3M/74 | **87** |
| XV-3M/90 | **89** |

### Cover

D
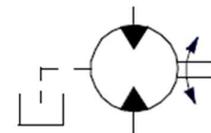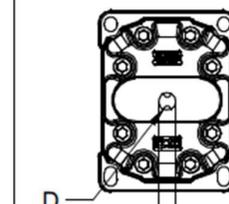
External drainage

E

### Body (threads/flanges)

| 3/4 BSP | D | 1" BSP | E | 1" 1/4 BSP | F |
|---|---|---|---|---|---|