



WAM®



1

# TECHNICAL CATALOGUE



- **"M 4\_" TYPE GEAR REDUCTION UNITS**  
TECHNICAL CATALOGUE
- ***TESTATE MOTRICI TIPO "M 4\_"***  
CATALOGO TECNICO

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**100**

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**WAM**®

All the products described in this catalogue are manufactured according to **WAM® S.p.A. Quality System procedures.**

The Company's Quality System, certified in July 1994 according to International Standards **UNI EN ISO 9002-94** and extended to **UNI EN ISO 9001-2000** in October, 2002, ensures that the entire production process, starting from the processing of the order to the technical service after delivery, is carried out in a controlled manner that guarantees the quality standard of the product.

*Alle in diesem Katalog beschriebenen Erzeugnisse werden in Konformität mit dem **Qualitätssystem der WAM® S.p.A. hergestellt.***

*Das im Juli 1994 zertifizierte Qualitätssystem entspricht der Norm **UNI EN ISO 9002-94** (im Oktober 2002 auf **UNI EN ISO 9001-2000** erweitert) und gewährleistet dem Kunden eine strenge Qualitätskontrolle in jeder Phase des Produktionsprozesses bis hin zum Kundendienst nach Auslieferung der Ware.*

Tous les produits décrits dans ce catalogue ont été réalisés selon les modalités opérationnelles définies **Système de Qualité de WAM® S.p.A.**

Le système de Qualité de l'entreprise, certifié au mois de juillet 1994 en conformité aux Normes Internationales **UNI EN ISO 9002-94** et successivement étendu à **UNI EN ISO 9001-2000** au mois de octobre 2002, est en mesure d'assurer que le procédé entier de production, à partir de la formulation de la commande jusqu'au service technique après la livraison, soit effectué de manière contrôlée et appropriée afin de garantir le standard de qualité du produit.

*Tutti i prodotti descritti in questo catalogo sono stati realizzati secondo modalità operative definite **Sistema Qualità di WAM® S.p.A.***

*Il Sistema Qualità aziendale, certificato dal luglio 1994 in conformità alle Normative Internazionali **UNI EN ISO 9002-94** e successivamente esteso alle Normative Internazionali **UNI EN ISO 9001-2000** nell'ottobre 2002, è in grado di assicurare che l'intero processo produttivo, dalla formulazione dell'ordine fino all'assistenza tecnica successiva alla consegna, venga effettuato in modo controllato ed adeguato a garantire lo standard qualitativo del prodotto.*



**UNI EN ISO 9001-2000  
Certified Company**

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**M4 series GEAR REDUCERS**  
**Technical features****GEARING**

- cylindrical gear

**SIZES**

- 5 sizes, with centre distance according to Ra 10 UNI 2017 (63...160).  
M41 / M43 / M45 / M47 / M49

**GEAR RATIOS**

- Nominal gear ratios in accordance with Ra 10 UNI 2017 (5, 6, 7, 10)

**PERFORMANCE**

- Loading capacity of gearing, calculated at breakage and surface pressure in accordance with ISO 6336/96, DIN 3990/87, AGMA 2001- C95.  
Nominal torques that can be transmitted to output shaft up to 1500 Nm. Installed power at input up to 30 kW.

**GEARS**

- Cylindrical gears with helicoid teeth with finished or ground involute profile.

**MATERIALS**

- Gears made of 20 MnCr 5 steel UNI EN 10084 – case-hardened and tempered
- Mechanical cast iron casing EN-GJL-250 UNI EN 1561.
- Output shaft made of C45 steel UNI EN 10083-2 induction hardened.
- Input shafts and P.A.M. Linings made of 20 MnCr5 UNI 10084 case-hardened and tempered.

**BEARINGS**

- Ball bearings.

**YIELD**

- The reference yield considered for calculating the performance indicated in this catalogue is:  $\eta = 0.98$

**PAINTING**

- RAL 5010 - blue.

**USE**

- The M4 series gear reducers can be mounted directly on screws like gear reduction units: in this case a seal is usually mounted on XUH type output shaft.

**TEMPERATURE**

- The M4 series gear reducers are supplied with lubricant for use at ambient temperature (0°C - 40°C).
- For ambient temperatures exceeding 40°C use oil having viscosity immediately higher than that indicated in the Table.
- If the ambient temperature is less than a 0°C, use oil having viscosity immediately lower than that shown in the Table (ref. Maintenance Catalogue).

**TESTATE MOTRICI serie M4**  
**Caratteristiche tecniche****ROTISMO**

- Ad un ingranaggio cilindrico

**GRANDEZZE**

- N° 5 grandezze con interasse secondo Ra 10 UNI 2017 (63...160).  
M41 / M43 / M45 / M47 / M49

**RAPPORTI DI TRASMISSIONE**

- Rapporti di trasmissioni nominali secondo Ra 10 UNI 2017 (5, 6, 7, 10)

**PRESTAZIONI**

- Capacità di carico del rotismo, calcolata a rottura e a pressione superficiale secondo ISO 6336/96, DIN 3990/87, AGMA 2001- C95.  
Momenti torcenti nominali trasmissibili all'albero lento fino a 1500 Nm. Potenze installabili in entrata fino a 30 kW.

**INGRANAGGI**

- Ingranaggi cilindrici a dentatura elicoidale con profilo ad evolvente rasato o rettificato.

**MATERIALI**

- Ingranaggi costruiti in acciaio 20 MnCr 5 UNI EN 10084 - cementati e temprati.
- Carcassa in fusione di ghisa meccanica EN-GJL-250 UNI EN 1561.
- Alberi di uscita in acciaio C45 UNI EN 10083-2 temprati ad induzione.
- Alberi di entrata e manicotti P.A.M. in acciaio 20 MnCr5 UNI 10084 cementati e temprati.

**CUSCINETTI**

- Volventi a sfere.

**RENDIMENTI**

- Il rendimento di riferimento considerato per il calcolo delle prestazioni indicate nel presente catalogo è:  $\eta = 0.98$

**VERNICIATURA**

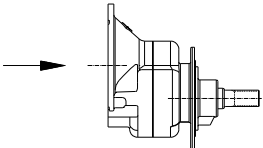
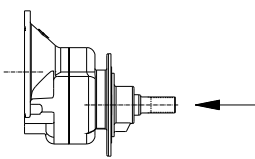
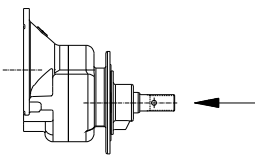
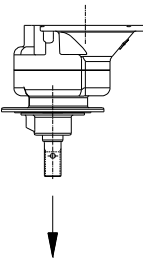
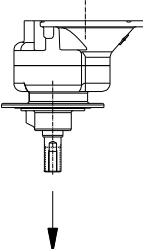
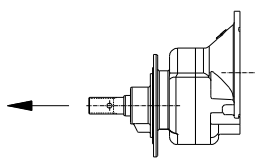
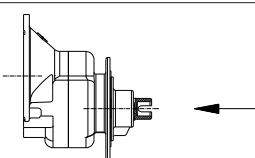
- RAL 5010 - blu.

**UTILIZZO**

- I riduttori serie M4 possono essere montati direttamente sulle coclee come testate motrici: in questo caso viene normalmente montata una tenuta sull'albero uscita tipo XUH.

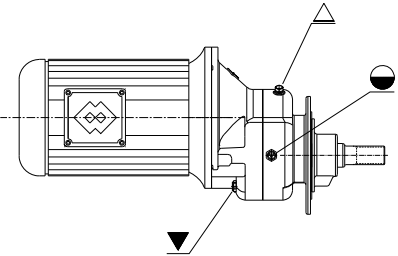
**TEMPERATURA**

- I riduttori serie M4 sono forniti con lubrificante per impiego a temperatura ambiente (0°C - 40°C).
- Per temperature dell'ambiente superiori a 40°C adottare olio con viscosità immediatamente superiore a quella indicata in tabella.
- Se la temperatura dell'ambiente è inferiore a 0°C, adottare olio con viscosità immediatamente inferiore a quella prevista in tabella (rif. Catalogo Maintenance).

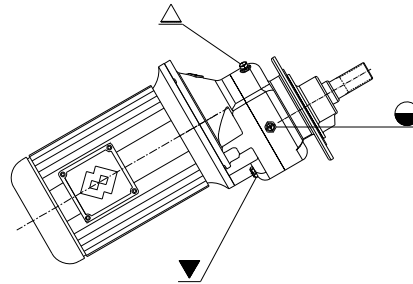
| INPUT / ENTRATA   | Type / Tipo | Description  | Descrizione   |
|---|-------------|--|---|
|    | <b>PAM</b>  | To be bolted to B5 motor   | Predisposto attacco motore B5   |
| OUTPUT / USCITA   | Type / Tipo | Description  | Descrizione   |
|    | <b>ES</b>   | Standard outputs for tubular screw conveyors.<br>Grooved output shaft in accordance with DIN 5482.   | Uscita di Serie per coclee tubolari.<br>Albero di uscita scanalato secondo DIN 5482.  |
|   | <b>EV</b>   | Non standard outputs for tubular screw conveyors.<br>Like ES output but with hole for pinning.   | Uscita non di serie per coclee tubolari.<br>Come uscita ES ma con foro per spinatura.   |
|  | <b>VE</b>   | Standard output for vertical screw conveyors.<br>Grooved output shaft in accordance with DIN 5482 with hole for pinning.<br>Assembly in vertical position with output shaft downwards resistant to traction forces | Uscita di Serie per coclee verticali.<br>L'albero di uscita è scanalato secondo DIN 5482 con foro per spinatura.<br>Montaggio in posizione verticale con albero di uscita verso il basso resistente a forze di trazione |
|  | <b>VE_G</b> | Non standard output for VE screw conveyors.<br>The output shaft has an axial hole for assembling coupling with joint in traction. Only available for sizes M45 - M47 - M49   | Uscita non di serie per coclee VE.<br>L'albero di uscita presenta un foro assiale per il montaggio dell' accoppiamento con giunto in trazione. Disponibile solo per le grandezze M45 - M47 - M49.                       |
|  | <b>VS</b>   | Non standard output, with output shaft resistant to traction forces like VE but can be mounted in a position different from vertical.  | Uscita non di serie, con albero di uscita resistente a forze di trazione come VE ma montabile in posizione diversa da quella verticale.   |
|  | <b>CM</b>   | The output shaft has a quick-release "bayonet" coupling specially designed for mortar mixers. Available only for sizes M41 - M43.  | L' albero di uscita si presenta con un particolare innesto rapido a "baionetta" appositamente studiato per i mescolatori per malte. Disponibile solo per le grandezze M41 - M43.  |

**OIL PLUGS POSITION - POSIZIONE DEI TAPPI OLIO**

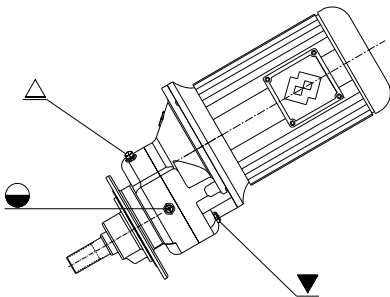
**Pos. ES**



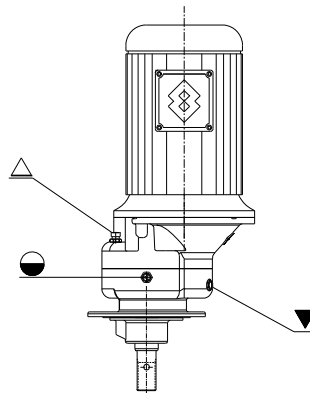
**Pos. ES**



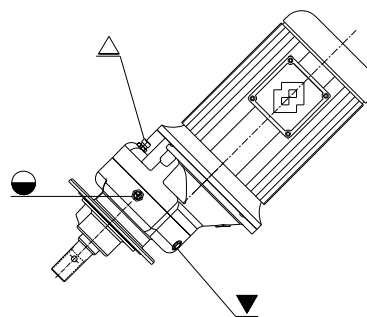
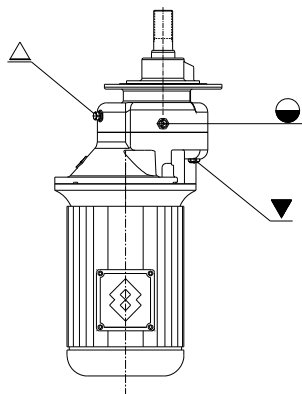
**Pos. ES**



**Pos. VE**



Assembly positions to be avoided (Consult the manufacturer)  
 Posizioni di montaggio da evitare (Consultare il produttore)



- △ BREATHER / SFIATO
- LEVEL / LIVELLO
- ▼ OUTLET / SCARICO



**Size - Grandezza**  
 41 - 43 - 45 - 47 - 49

**Gear Ratio - Rapporto Riduzione**  
 05 - 06 - 07 - 10

| Input - Entrata | Gear units<br>Riduttore |
|-----------------|-------------------------|
| 080             | M41 - M43               |
| 090             | M41 - M43               |
| 100 - 112       | M41 - M43 - M45         |
| 132             | M43 - M45 - M47         |
| 160             | M45 - M47 - M49         |
| 180             | M47 - M49               |
| 200             | M49                     |

| Output - Uscita  | Ø Screw<br>Ø Coclea |
|------------------|---------------------|
| ES-EV-VE-VS-CM   | 0 114-139           |
| ES-EV-VE-VS-CM   | 1 168               |
| ES-EV-VE-VS      | 2 193               |
| ES-EV-VE-VE_G-VS | 3 219               |
| ES-EV-VE-VE_G-VS | 4 273               |
| ES-EV-VE-VE_G-VS | 5 323               |

**G** = traction coupling - *giunto trazione*

M type gear reduction units are designed and produced mainly to be fitted on screw conveyors.

Le testate motrici serie M sono progettate e costruite fondamentalmente per essere montate su coclee.

| SELECTION PROCEDURE |   | PROCEDIMENTO DI SCELTA   |            |
|---------------------|---|--|------------|
| Set                 |   | Posto  |            |
| <b>N</b>            | Rotation speed of the screw conveyor            | Velocità di rotazione della coclea                                     | <b>RPM</b> |
| <b>Pa</b>           | Absorbed power (overload factor $F_o$ included) | Potenza assorbita (già comprensiva del fattore di sovraccarico $F_o$ ) | <b>kW</b>  |
| <b>Pi</b>           | Installed power                                 | Potenza installata   | <b>kW</b>  |
| <b>Ps</b>           | Gearbox selection power                         | Potenza di scelta riduttore  | <b>kW</b>  |
| <b>X</b>            | Worth representing a step on the power size     | Valore che rappresenta uno scalino nella grandezza delle potenze       |            |

Selection is based on  $P_s$  and is reported on the below table. Two cases can be:

- 1) Installed power  $P_i$  is "immediately" superior to the absorbed power  $P_a$   
(ex.  $P_i = 5,5 \text{ kW}$  and  $P_a = 4 \text{ kW}$ ).  
The gearbox is selected by considering  $P_s = P_a$
- 2) Installed power  $P_i$  is "highly" superior to the absorbed power  $P_a$   
(ex.  $P_i = 7,5 \text{ kW}$  and  $P_a = 3 \text{ kW}$ )  
The gearbox is selected by considering  $P_s = P_i - X$

In the below tables the safety factor of the gearbox as regards the selection power  $P_s$  is at least 1.  
For special request, contact please our Sales Department.

La scelta si basa su  $P_s$  ed è riportata nella tabella sottostante. Si possono avere 2 casi:

- 1) La potenza installata  $P_i$  è "immediatamente" superiore alla potenza assorbita  $P_a$   
(es.  $P_i = 5,5 \text{ kW}$  e  $P_a = 4 \text{ kW}$ ).  
Si sceglie il riduttore prendendo  $P_s = P_a$
- 2) La potenza installata  $P_i$  è "molto superiore" alla potenza assorbita  $P_a$   
(es.  $P_i = 7,5 \text{ kW}$  e  $P_a = 3 \text{ kW}$ )  
Si sceglie il riduttore prendendo  $P_s = P_i - X$

Nelle tabelle seguenti il fattore di servizio del riduttore rispetto alla potenza di scelta  $P_s$  è almeno 1.  
Per richieste particolari rivolgersi al ns. Ufficio Tecnico Commerciale.

**4-pole-50Hz electric motors/Gear boxes/Screw conveyors combinations - Abbinamenti Motori elettrici 4 poli-50Hz/Riduttori/Coclee**

| RPM | Ø screw coclea | kW   |      |     |     |     |     |     |     |     |     |     |     |      |     |     | ratio rapporto |     |
|-----|----------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|----------------|-----|
|     |                | 80   |      | 90  |     | 100 |     | 112 | 132 |     |     | 160 |     | 180  |     | 200 |                |     |
|     |                | 0.55 | 0.75 | 1.1 | 1.5 | 2.2 | 3   | 4   | 5.5 | 7.5 | 9.2 | 11  | 15  | 18.5 | 22  | 30  |                |     |
| 290 | 114            | M41  | M41  | M41 | M41 | M41 | M41 | M43 | /   | /   | /   | /   | /   | /    | /   | /   | 5              |     |
|     | 139            | M41  | M41  | M41 | M41 | M41 | M41 | M43 | /   | /   | /   | /   | /   | /    | /   | /   |                |     |
|     | 168            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45 | M47  | /   | /   |                |     |
|     | 193            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45  | M47 | /   |                | /   |
|     | 219            | /    | /    | M43 | M43 | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45  | M47 | M47 |                | M49 |
|     | 273            | /    | /    | /   | /   | /   | /   | /   | /   | M45 | M45 | M45 | M45 | M45  | M47 | M47 |                | M49 |
|     | 323            | /    | /    | /   | /   | /   | /   | /   | /   | M45 | M45 | M45 | M45 | M45  | M47 | M47 |                | M49 |
| 230 | 114            | M41  | M41  | M41 | M41 | M41 | /   | /   | /   | /   | /   | /   | /   | /    | /   | /   | 6              |     |
|     | 139            | M41  | M41  | M41 | M41 | M41 | /   | /   | /   | /   | /   | /   | /   | /    | /   | /   |                |     |
|     | 168            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45 | M47 | /    | /   | /   |                |     |
|     | 193            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45 | M47 | /    | /   | /   |                |     |
|     | 219            | /    | /    | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M45 | M47 | M47  | M49 | M49 |                |     |
|     | 273            | /    | /    | /   | /   | M45 | M45 | M45 | M45 | M45 | M45 | M45 | M47 | M47  | M49 | M49 |                |     |
|     | 323            | /    | /    | /   | /   | M45 | M45 | M45 | M45 | M45 | M45 | M45 | M47 | M47  | M49 | M49 |                |     |
| 205 | 114            | M41  | M41  | M41 | M41 | M43 | M43 | M43 | /   | /   | /   | /   | /   | /    | /   | /   | 7              |     |
|     | 139            | M41  | M41  | M41 | M41 | M43 | M43 | M43 | /   | /   | /   | /   | /   | /    | /   | /   |                |     |
|     | 168            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M47 | M47 | /    | /   | /   |                |     |
|     | 193            | M43  | M43  | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M47 | M47 | /    | /   | /   |                |     |
|     | 219            | /    | /    | M43 | M43 | M43 | M43 | M43 | M45 | M45 | M45 | M47 | M47 | M49  | M49 | /   |                |     |
|     | 273            | /    | /    | /   | /   | M45 | M45 | M45 | M45 | M45 | M45 | M47 | M47 | M49  | M49 | /   |                |     |
|     | 323            | /    | /    | /   | /   | M45 | M45 | M45 | M45 | M45 | M45 | M47 | M47 | M49  | M49 | /   |                |     |
| 145 | 114            | M41  | M41  | M41 | M43 | M43 | /   | /   | /   | /   | /   | /   | /   | /    | /   | /   | 10             |     |
|     | 139            | M41  | M41  | M41 | M43 | M43 | /   | /   | /   | /   | /   | /   | /   | /    | /   | /   |                |     |
|     | 168            | M43  | M43  | M43 | M43 | M43 | M45 | M45 | M47 | M47 | M47 | /   | /   | /    | /   | /   |                |     |
|     | 193            | M43  | M43  | M43 | M43 | M43 | M45 | M45 | M47 | M47 | M47 | /   | /   | /    | /   | /   |                |     |
|     | 219            | /    | /    | M43 | M43 | M43 | M45 | M45 | M47 | M47 | M47 | M49 | M49 | M49  | /   | /   |                |     |
|     | 273            | /    | /    | /   | /   | M45 | M45 | M45 | M47 | M47 | M47 | M49 | M49 | M49  | /   | /   |                |     |
|     | 323            | /    | /    | /   | /   | M45 | M45 | M45 | M47 | M47 | M47 | M49 | M49 | M49  | /   | /   |                |     |



| $i_n$ | $n_1$ | $n_2$ | M 41  |       | M 43  |       | M 45  |       | M 47  |       | M 49  |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       |       |       | $T_n$ | $P_n$ | $T_n$ | $P_n$ | $T_n$ | $P_n$ | $T_n$ | $P_n$ | $T_n$ | $P_n$ |
| 5     | 2900  | 580   | 90    | 5.4   | 180   | 11.3  | 420   | 26.9  | 580   | 34.9  | 1200  | 75.5  |
|       | 1450  | 290   | 110   | 3.3   | 225   | 7.1   | 555   | 17.7  | 735   | 22.1  | 1500  | 47.2  |
|       | 1000  | 200   | 115   | 2.4   | 230   | 5.0   | 565   | 12.5  | 850   | 17.6  | 1750  | 38.0  |
|       | 750   | 150   | 120   | 1.9   | 235   | 3.8   | 575   | 9.5   | 920   | 14.3  | 1900  | 30.9  |
| 6     | 2900  | 483   | 65    | 3.6   | 160   | 8.3   | 380   | 19.9  | 550   | 30.1  | 1250  | 65.6  |
|       | 1450  | 242   | 80    | 2.2   | 200   | 5.2   | 460   | 12.1  | 700   | 19.1  | 1570  | 41.2  |
|       | 1000  | 167   | 85    | 1.6   | 205   | 3.7   | 470   | 8.5   | 730   | 13.8  | 1690  | 30.6  |
|       | 750   | 125   | 90    | 1.3   | 210   | 2.8   | 480   | 6.5   | 750   | 10.6  | 1790  | 24.3  |
| 7     | 2900  | 414   | 70    | 3.1   | 140   | 6.6   | 320   | 15.0  | 590   | 26.5  | 1230  | 57.8  |
|       | 1450  | 207   | 85    | 1.9   | 180   | 4.2   | 410   | 9.6   | 720   | 16.2  | 1500  | 35.2  |
|       | 1000  | 143   | 90    | 1.4   | 185   | 3.0   | 420   | 6.8   | 730   | 11.3  | 1540  | 24.9  |
|       | 750   | 107   | 95    | 1.1   | 190   | 2.3   | 430   | 5.2   | 740   | 8.6   | 1560  | 18.9  |
| 10    | 2900  | 290   | 50    | 1.6   | 100   | 3.4   | 240   | 7.5   | 440   | 14.2  | 820   | 27.6  |
|       | 1450  | 145   | 72    | 1.1   | 132   | 2.2   | 310   | 4.9   | 578   | 9.2   | 1084  | 18.5  |
|       | 1000  | 100   | 65    | 0.70  | 130   | 1.5   | 315   | 3.4   | 560   | 6.2   | 1060  | 12.3  |
|       | 750   | 75    | 70    | 0.57  | 135   | 1.2   | 320   | 2.6   | 570   | 4.8   | 1100  | 9.6   |

$i_n$  = gear ratio - *rapporto di trasmissione nominale*

$n_1$  = number of e-motor revolutions - *numero di giri al minuto in entrata*

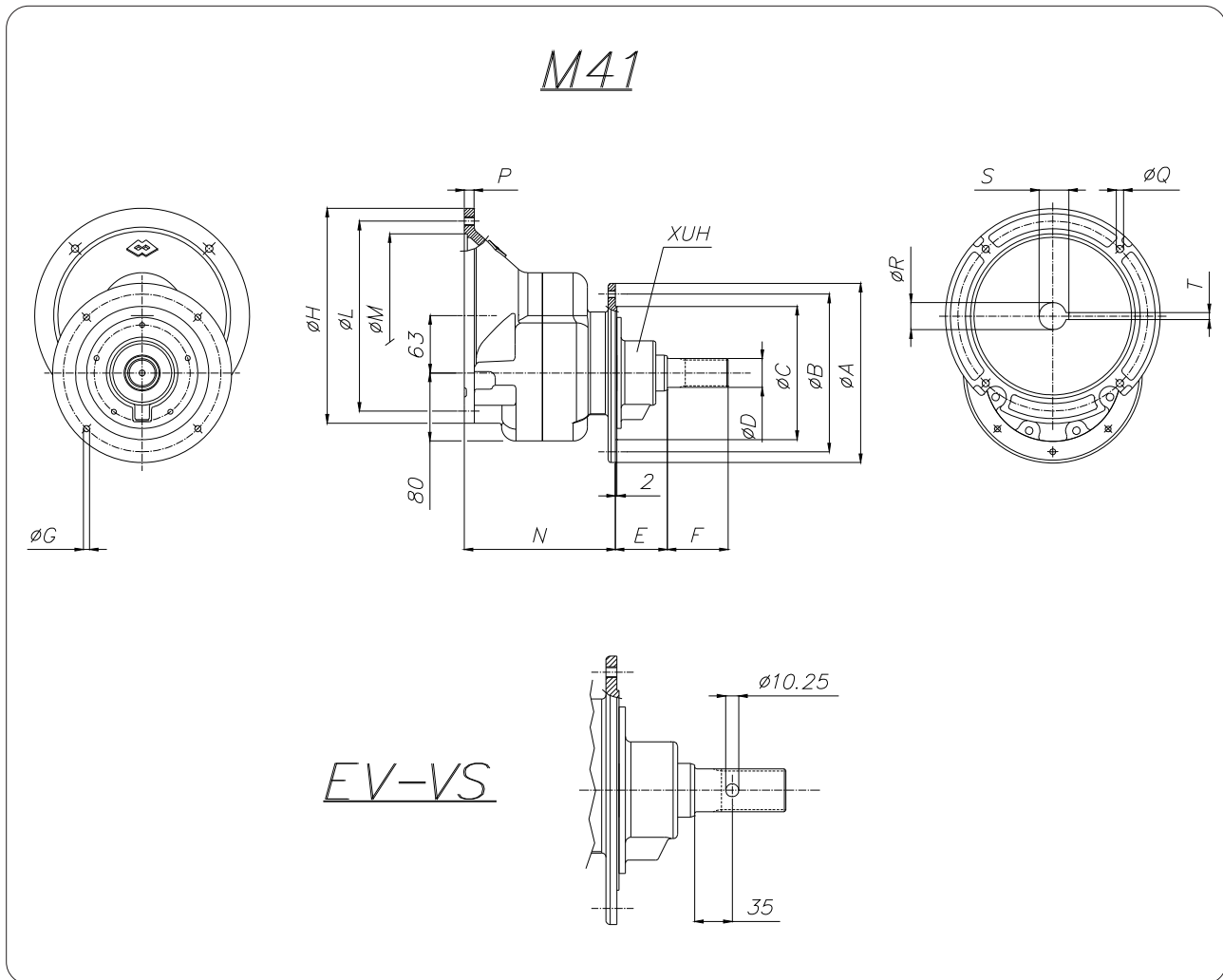
$n_2$  = Rpm at output shaft - *numero di giri al minuto in uscita*

$T_n$  = output nominal torque [Nm] - *momento torcente nominale in uscita [Nm]*

$P_n$  = input nominal power [kW] - *potenza nominale in entrata [kW]*

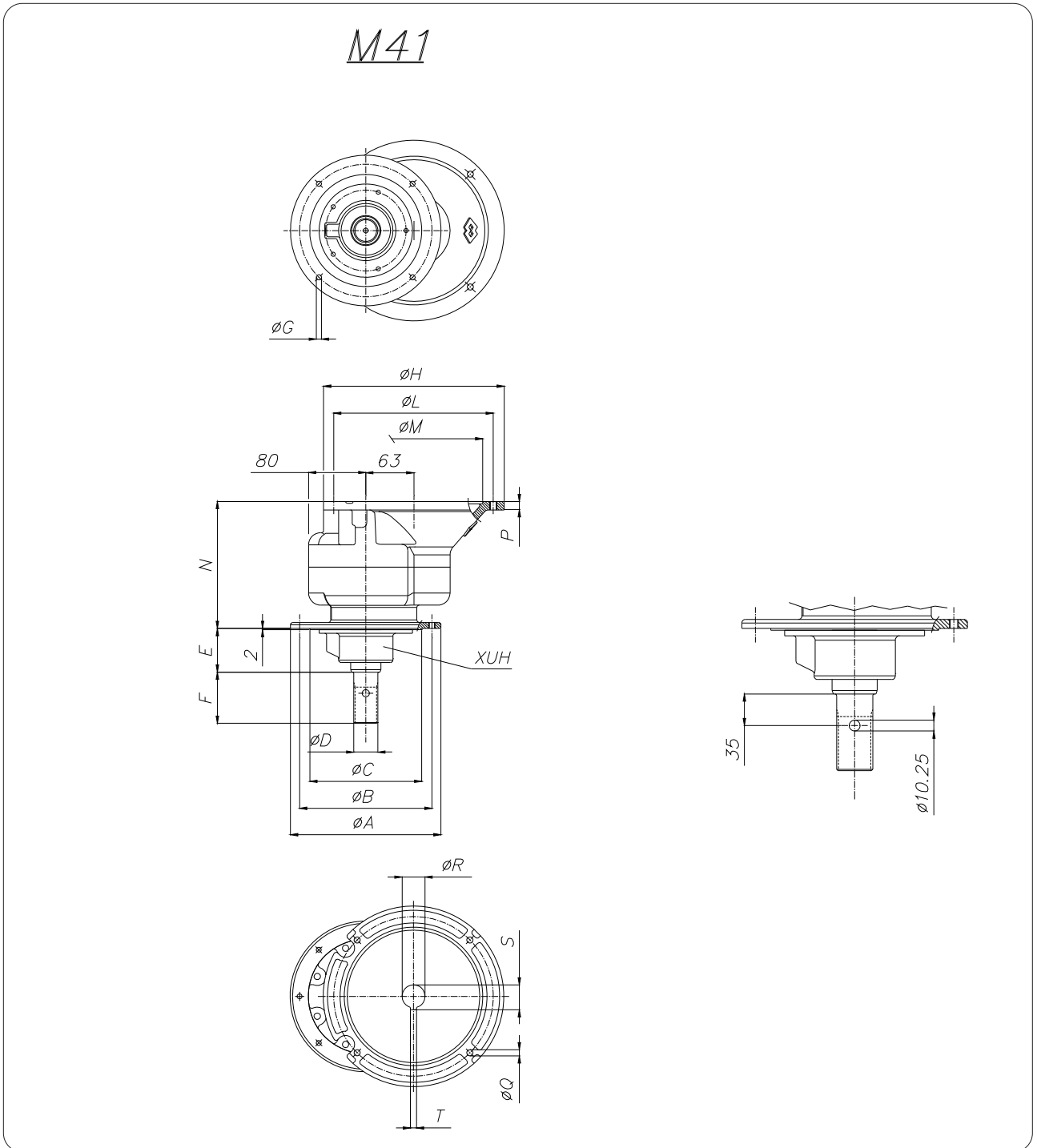
The power ratings indicated in the Table are those relative to service factor =1 for each reduction gear.

Le potenze riassunte in tabella sono quelle relative al fattore di servizio =1 per ciascun riduttore.



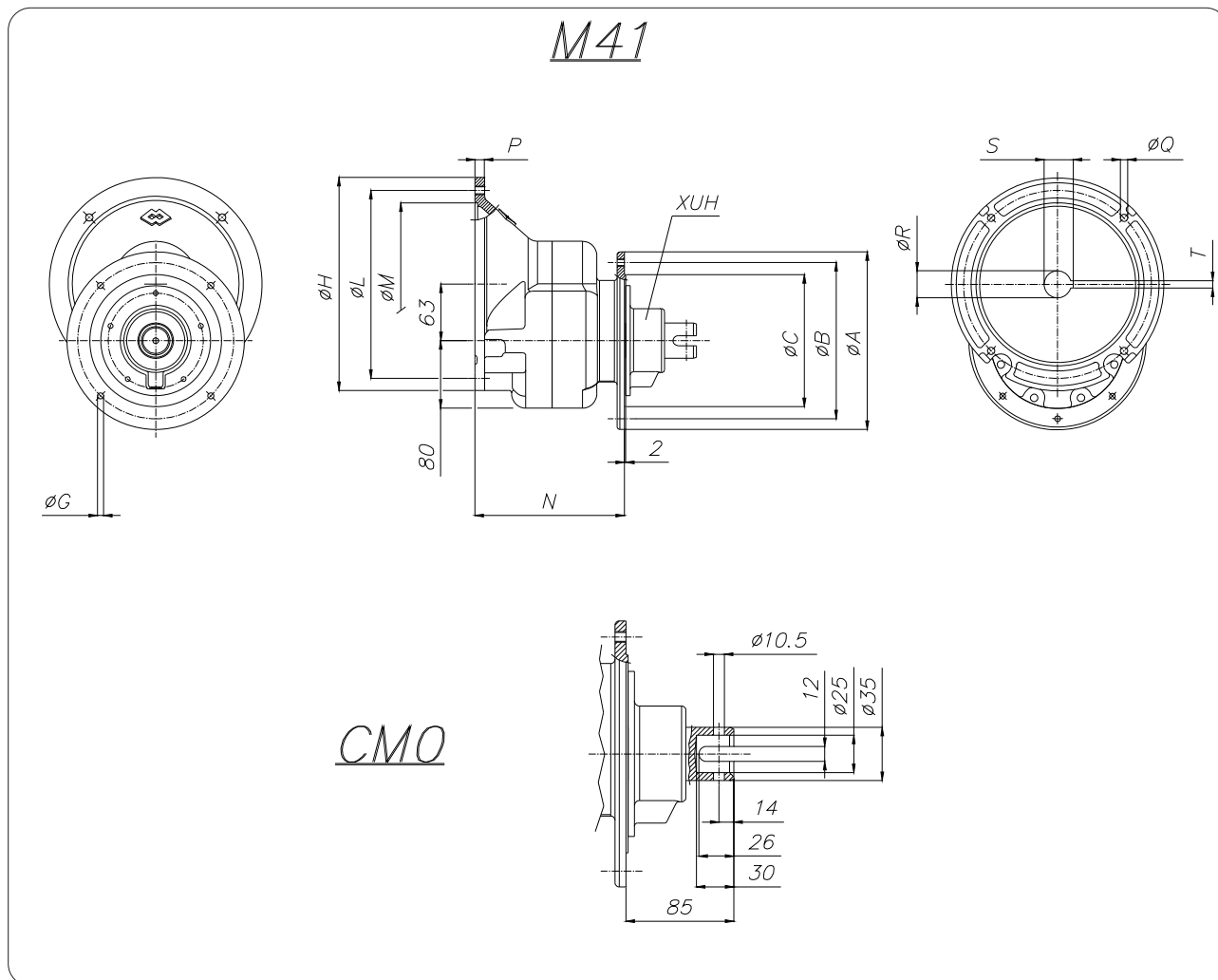
| Gear reducer<br>Testata motrice | Output<br>Uscita | 0 | ø Feeder - Coclea | ø A | ø B | ø C | ø D<br>DIN 5482 | E  | F  | ø G |    |
|---------------------------------|------------------|---|-------------------|-----|-----|-----|-----------------|----|----|-----|----|
|                                 |                  |   |                   |     |     |     |                 |    |    | N°  | Ø  |
| M41                             | ES-EV-VS         | 0 | 114 - 139         | 190 | 170 | 148 | 28 X 25         | 54 | 65 | 4   | M8 |

| Motor size<br>Grand. motore | ø H | ø L | ø M | N     | P  | ø Q  | ø R | S    | T | Weight - Peso<br>kg |     |     |     |     |
|-----------------------------|-----|-----|-----|-------|----|------|-----|------|---|---------------------|-----|-----|-----|-----|
|                             |     |     |     |       |    |      |     |      |   | ES0                 | ES1 | ES2 | ES3 | ES4 |
| 80                          | 200 | 165 | 130 | 157.5 | 12 | M 10 | 19  | 21.5 | 6 | 15.7                | /   | /   | /   | /   |
| 90                          | 200 | 165 | 130 | 157.5 | 12 | M 10 | 24  | 27   | 8 | 15.7                | /   | /   | /   | /   |
| 100 - 112                   | 250 | 215 | 180 | 167.5 | 14 | M 12 | 28  | 31   | 8 | 15.7                | /   | /   | /   | /   |



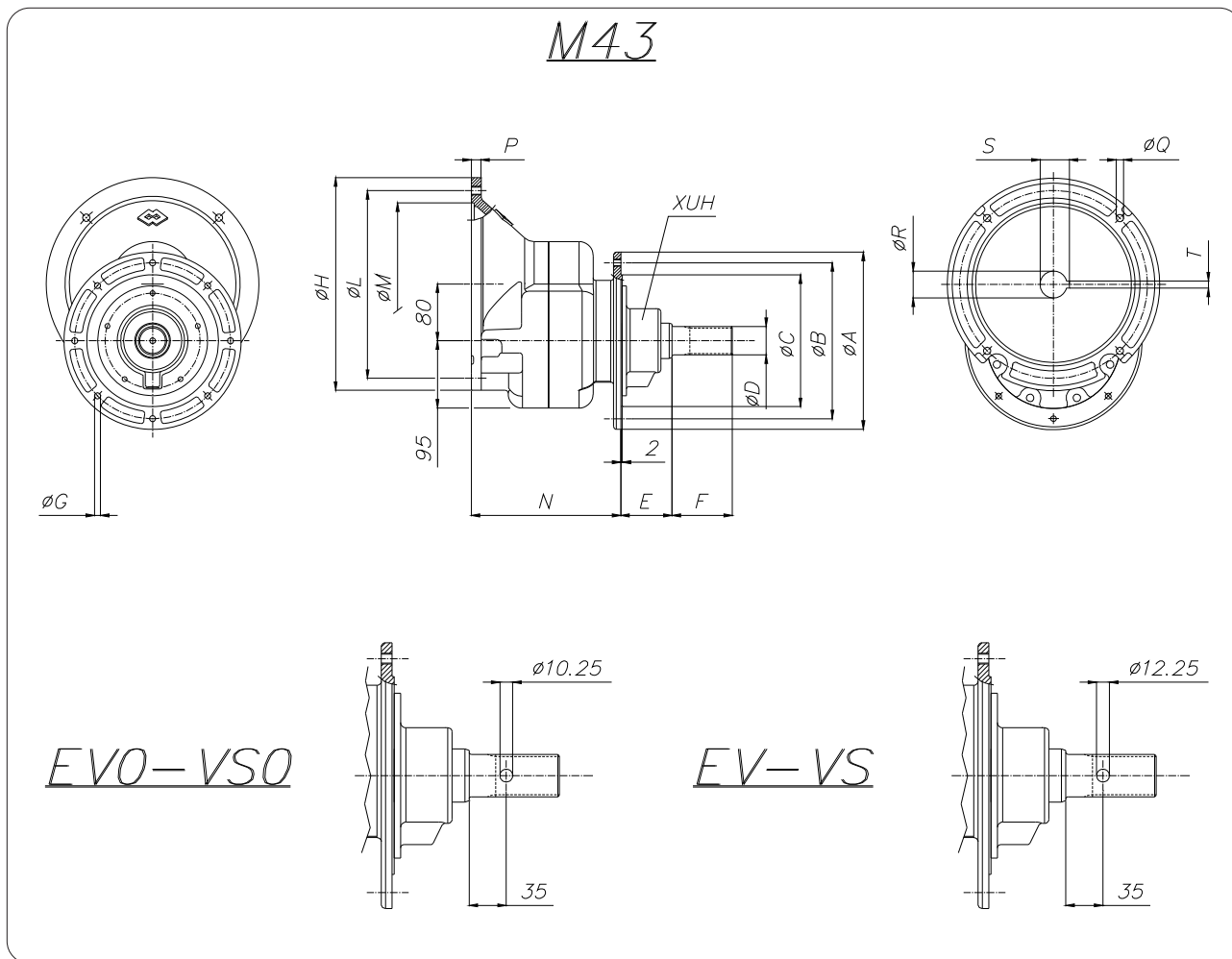
| Gear reducer<br>Testata motrice | Output<br>Uscita | 0 | Feeder - Coclea<br>$\phi$ | $\phi A$ | $\phi B$ | $\phi C$ | $\phi D$<br>DIN 5482 | E  | F  | $\phi G$ |        |
|---------------------------------|------------------|---|---------------------------|----------|----------|----------|----------------------|----|----|----------|--------|
|                                 |                  |   |                           |          |          |          |                      |    |    | N°       | $\phi$ |
| M41                             | VE               | 0 | 114 - 139                 | 190      | 170      | 148      | 28 X 25              | 54 | 65 | 4        | M8     |

| Motor size<br>Grand. motore | $\phi H$ | $\phi L$ | $\phi M$ | N     | P  | $\phi Q$ | $\phi R$ | S    | T | Weight - Peso<br>kg |     |     |     |     |
|-----------------------------|----------|----------|----------|-------|----|----------|----------|------|---|---------------------|-----|-----|-----|-----|
|                             |          |          |          |       |    |          |          |      |   | VE0                 | VE1 | VE2 | VE3 | VE4 |
| 80                          | 200      | 165      | 130      | 157.5 | 12 | M 10     | 19       | 21.5 | 6 | 15.7                | /   | /   | /   | /   |
| 90                          | 200      | 165      | 130      | 157.5 | 12 | M 10     | 24       | 27   | 8 | 15.7                | /   | /   | /   | /   |
| 100 - 112                   | 250      | 215      | 180      | 167.5 | 14 | M 12     | 28       | 31   | 8 | 15.7                | /   | /   | /   | /   |



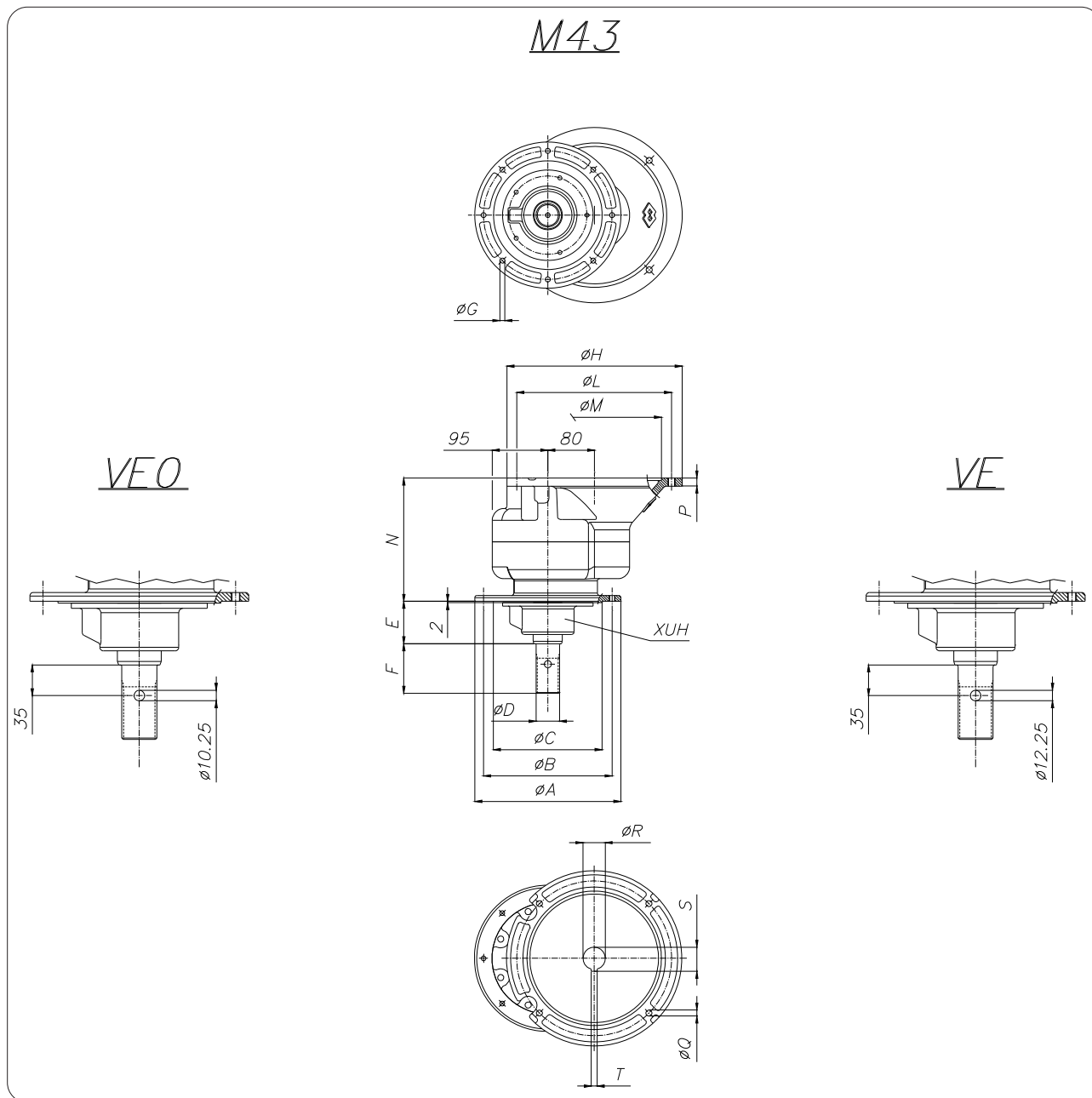
| Gear reducer<br>Testata motrice | Output<br>Uscita | 0 | Feeder - Coclea<br>ø | ø A | ø B | ø C | ø D<br>DIN 5482 | E | F | ø G |     |
|---------------------------------|------------------|---|----------------------|-----|-----|-----|-----------------|---|---|-----|-----|
|                                 |                  |   |                      |     |     |     |                 |   |   | N°  | ø   |
| M41                             | CM               | 0 | 114 - 139            | 190 | 170 | 148 | /               | / | / | 4   | M 8 |

| Motor size<br>Grand. motore | ø H | ø L | ø M | N     | P  | ø Q  | ø R | S  | T | Weight - Peso<br>kg |     |
|-----------------------------|-----|-----|-----|-------|----|------|-----|----|---|---------------------|-----|
|                             |     |     |     |       |    |      |     |    |   | CM0                 | CM1 |
| 100 - 112                   | 250 | 215 | 180 | 167.5 | 14 | M 12 | 28  | 31 | 8 | 17.5                | /   |



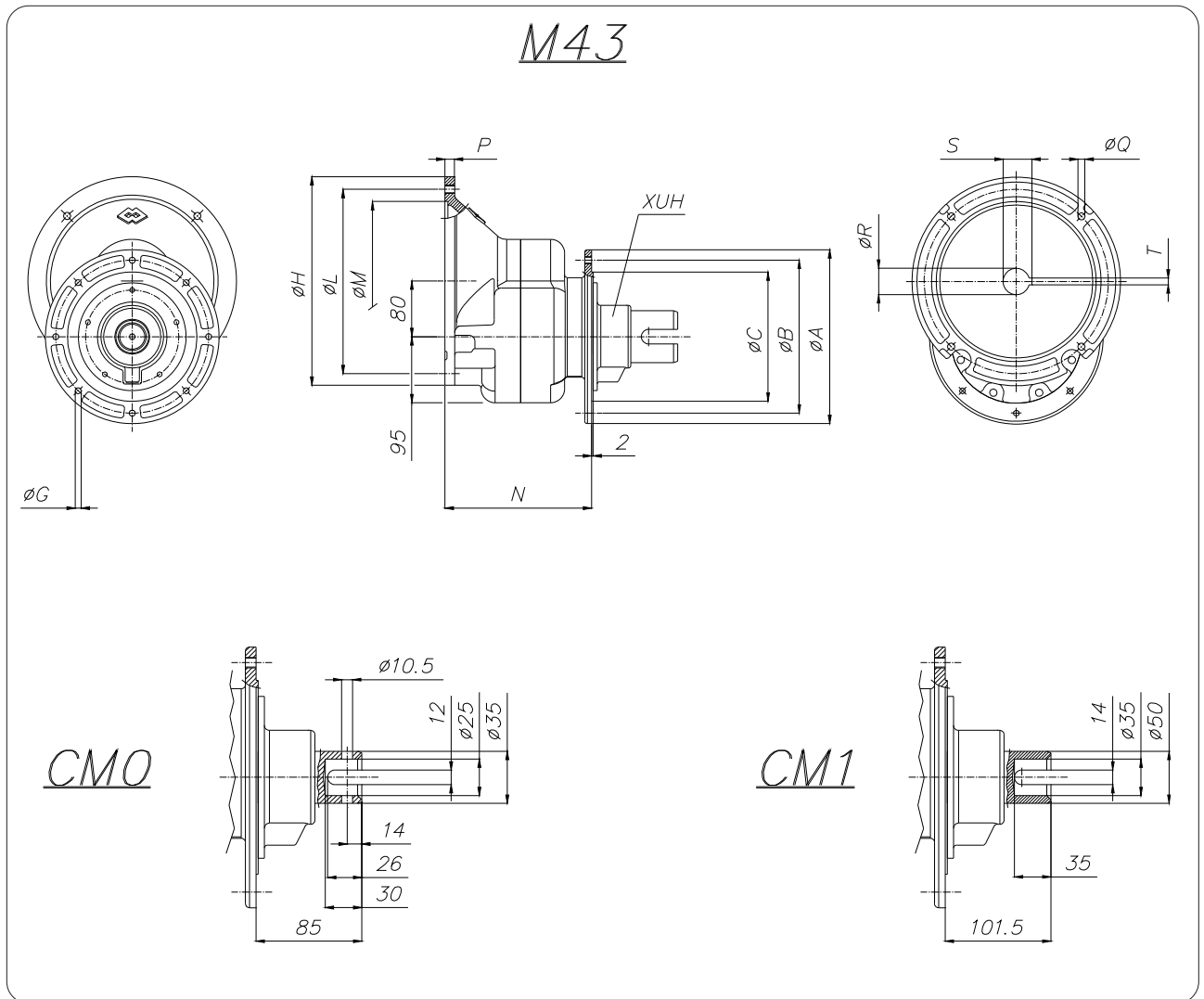
| Gear reducer<br>Testata motrice | Output<br>Uscita | 0 | Ø<br>Feeder - Coclea | Ø A | Ø B | Ø C | Ø D<br>DIN 5482 | E    | F  | Ø G |      |
|---------------------------------|------------------|---|----------------------|-----|-----|-----|-----------------|------|----|-----|------|
|                                 |                  |   |                      |     |     |     |                 |      |    | N°  | Ø    |
| <b>M43</b>                      | ES-EV-VS         | 0 | 114 - 139            | 190 | 170 | 148 | 28 x 25         | 54   | 65 | 4   | M 8  |
|                                 | ES-EV-VS         | 1 | 168                  | 250 | 220 | 162 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS         | 2 | 193                  | 250 | 220 | 186 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS         | 3 | 219                  | 275 | 250 | 210 | 40 x 36         | 72.5 | 85 | 8   | M 10 |

| Motor size<br>Grand. motore | Ø H | Ø L | Ø M | N   |     | P  | Ø Q  | Ø R | S    | T  | Weight - Peso<br>kg |     |     |      |   |
|-----------------------------|-----|-----|-----|-----|-----|----|------|-----|------|----|---------------------|-----|-----|------|---|
|                             |     |     |     | ES0 | ES1 |    |      |     |      |    | ES2                 | ES3 | ES4 |      |   |
| <b>80</b>                   | 200 | 165 | 130 | /   | 181 | 12 | M 10 | 19  | 21.5 | 6  | /                   | 24  | 24  | /    | / |
| <b>90</b>                   | 200 | 165 | 130 | 171 | 181 | 12 | M 10 | 24  | 27   | 8  |                     | 24  | 24  | 26.5 | / |
| <b>100 - 112</b>            | 250 | 215 | 180 | 181 | 191 | 14 | M 12 | 28  | 31   | 8  |                     | 26  | 26  | 28.5 | / |
| <b>132</b>                  | 300 | 265 | 230 | /   | 211 | 14 | M 12 | 38  | 41   | 10 | /                   | 29  | 29  | 31   | / |



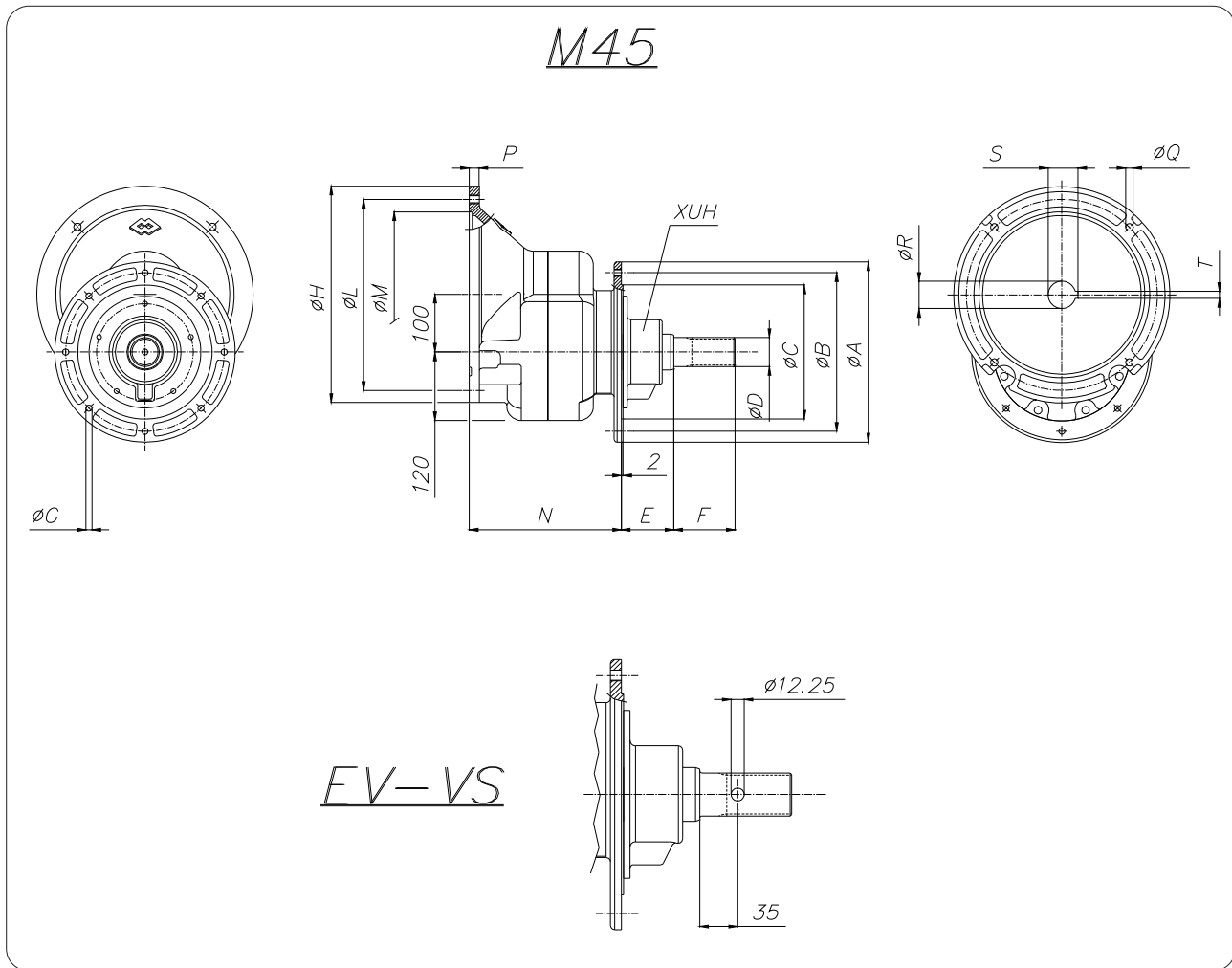
| Gear reducer<br>Testata motrice | Output<br>Uscita |        | $\phi$<br>Feeder - Coclea | $\phi A$ | $\phi B$ | $\phi C$ | $\phi D$<br>DIN 5482 | E    | F  | $\phi G$ |      |
|---------------------------------|------------------|--------|---------------------------|----------|----------|----------|----------------------|------|----|----------|------|
|                                 | N°               | $\phi$ |                           |          |          |          |                      |      |    |          |      |
| M43                             | VE               | 0      | 114 - 139                 | 190      | 170      | 148      | 28 x 25              | 54   | 65 | 4        | M 8  |
|                                 | VE               | 1      | 168                       | 250      | 220      | 162      | 40 x 36              | 72.5 | 85 | 8        | M 10 |
|                                 | VE               | 2      | 193                       | 250      | 220      | 186      | 40 x 36              | 72.5 | 85 | 8        | M 10 |
|                                 | VE               | 3      | 219                       | 275      | 250      | 210      | 40 x 36              | 72.5 | 85 | 8        | M 10 |

| Motor size<br>Grand. motore | $\phi H$ | $\phi L$ | $\phi M$ | N   |     | P  | $\phi Q$ | $\phi R$ | S    | T  | Weight - Peso<br>kg |     |     |      |     |
|-----------------------------|----------|----------|----------|-----|-----|----|----------|----------|------|----|---------------------|-----|-----|------|-----|
|                             |          |          |          | VE0 |     |    |          |          |      |    | VE0                 | VE1 | VE2 | VE3  | VE4 |
| 80                          | 200      | 165      | 130      | /   | 181 | 12 | M 10     | 19       | 21.5 | 6  | /                   | 24  | 24  | /    | /   |
| 90                          | 200      | 165      | 130      | 171 | 181 | 12 | M 10     | 24       | 27   | 8  |                     | 24  | 24  | 26.5 | /   |
| 100 - 112                   | 250      | 215      | 180      | 181 | 191 | 14 | M 12     | 28       | 31   | 8  |                     | 26  | 26  | 28.5 | /   |
| 132                         | 300      | 265      | 230      | /   | 211 | 14 | M 12     | 38       | 41   | 10 | /                   | 29  | 29  | 31   | /   |



| Gear reducer<br>Testata motrice | Output<br>Uscita | N° | $\phi$ Feeder - Coclea | $\phi A$ | $\phi B$ | $\phi C$ | $\phi D$<br>DIN 5482 | E | F | $\phi G$ |        |
|---------------------------------|------------------|----|------------------------|----------|----------|----------|----------------------|---|---|----------|--------|
|                                 |                  |    |                        |          |          |          |                      |   |   | N°       | $\phi$ |
| M43                             | CM 0             | 4  | 114 - 139              | 190      | 170      | 148      | /                    | / | / | 8        | M 8    |
|                                 | CM 1             | 8  | 168                    | 250      | 220      | 162      | /                    | / | / | 8        | M 10   |

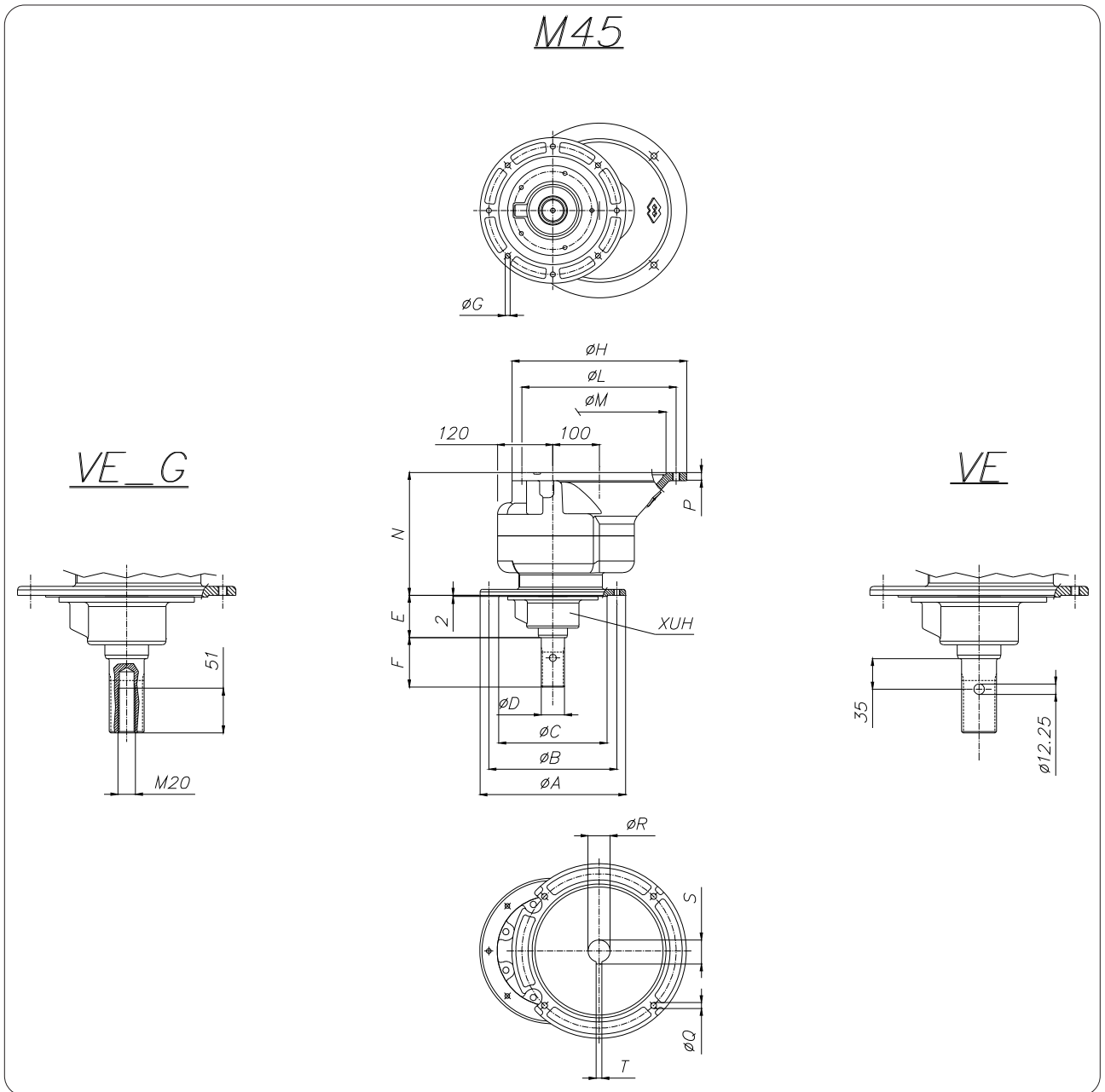
| Motor size<br>Grand. motore | $\phi H$ | $\phi L$ | $\phi M$ | N   |     | P  | $\phi Q$ | $\phi R$ | S  | T  | Weight - Peso<br>kg |     |
|-----------------------------|----------|----------|----------|-----|-----|----|----------|----------|----|----|---------------------|-----|
|                             |          |          |          | CM0 | CM1 |    |          |          |    |    | CM0                 | CM1 |
| 100 - 112                   | 250      | 215      | 180      | 181 | 191 | 14 | M 12     | 28       | 31 | 8  | /                   | 26  |
| 132                         | 300      | 265      | 230      | /   | 211 | 14 | M 12     | 38       | 41 | 10 | /                   | 29  |



| Gear reducer<br>Testata motrice | Output<br>Uscita | 1 | $\phi$<br>Feeder - Coclea | $\phi A$ | $\phi B$ | $\phi C$ | $\phi D$<br>DIN 5482 | E    | F  | $\phi G$ |        |
|---------------------------------|------------------|---|---------------------------|----------|----------|----------|----------------------|------|----|----------|--------|
|                                 |                  |   |                           |          |          |          |                      |      |    | N°       | $\phi$ |
| <b>M45</b>                      | ES-EV-VS         | 1 | 168                       | 250      | 220      | 162      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | ES-EV-VS         | 2 | 193                       | 250      | 220      | 186      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | ES-EV-VS         | 3 | 219                       | 275      | 250      | 210      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | ES-EV-VS         | 4 | 273                       | 330      | 305      | 265      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | ES-EV-VS         | 5 | 323                       | 405      | 370      | 315      | 40 x 36              | 72.5 | 85 | 8        | M 10   |

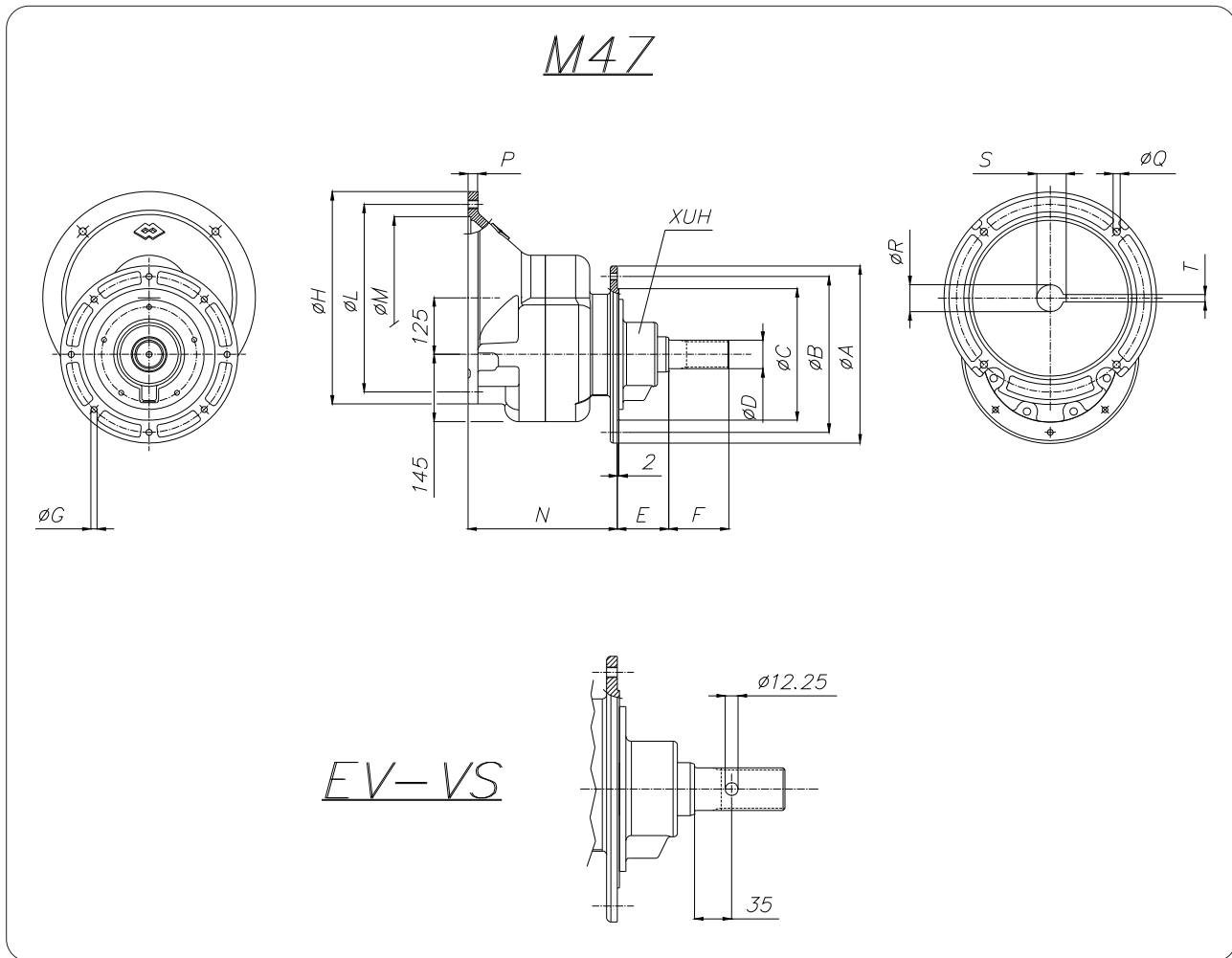
| Motor size<br>Grand. motore | $\phi H$ | $\phi L$ | $\phi M$ | N   | P  | $\phi Q$ | $\phi R$ | S  | T  | Weight - Peso<br>kg |      |      |      |     |
|-----------------------------|----------|----------|----------|-----|----|----------|----------|----|----|---------------------|------|------|------|-----|
|                             |          |          |          |     |    |          |          |    |    | ES1                 | ES2  | ES3  | ES4  | ES5 |
| <b>100 - 112</b>            | 250      | 215      | 180      | 210 | 14 | M 12     | 28       | 31 | 8  | 36.5                | 36.5 | 38.5 | 40.5 |     |
| <b>132</b>                  | 300      | 265      | 230      | 230 | 14 | M 12     | 38       | 41 | 10 | 40                  | 40   | 42.5 | 45.5 |     |
| <b>160</b>                  | 350      | 300      | 250      | 260 | 15 | M 16     | 42       | 45 | 12 | 44.5                | 44.5 | 46.5 | 49.5 |     |





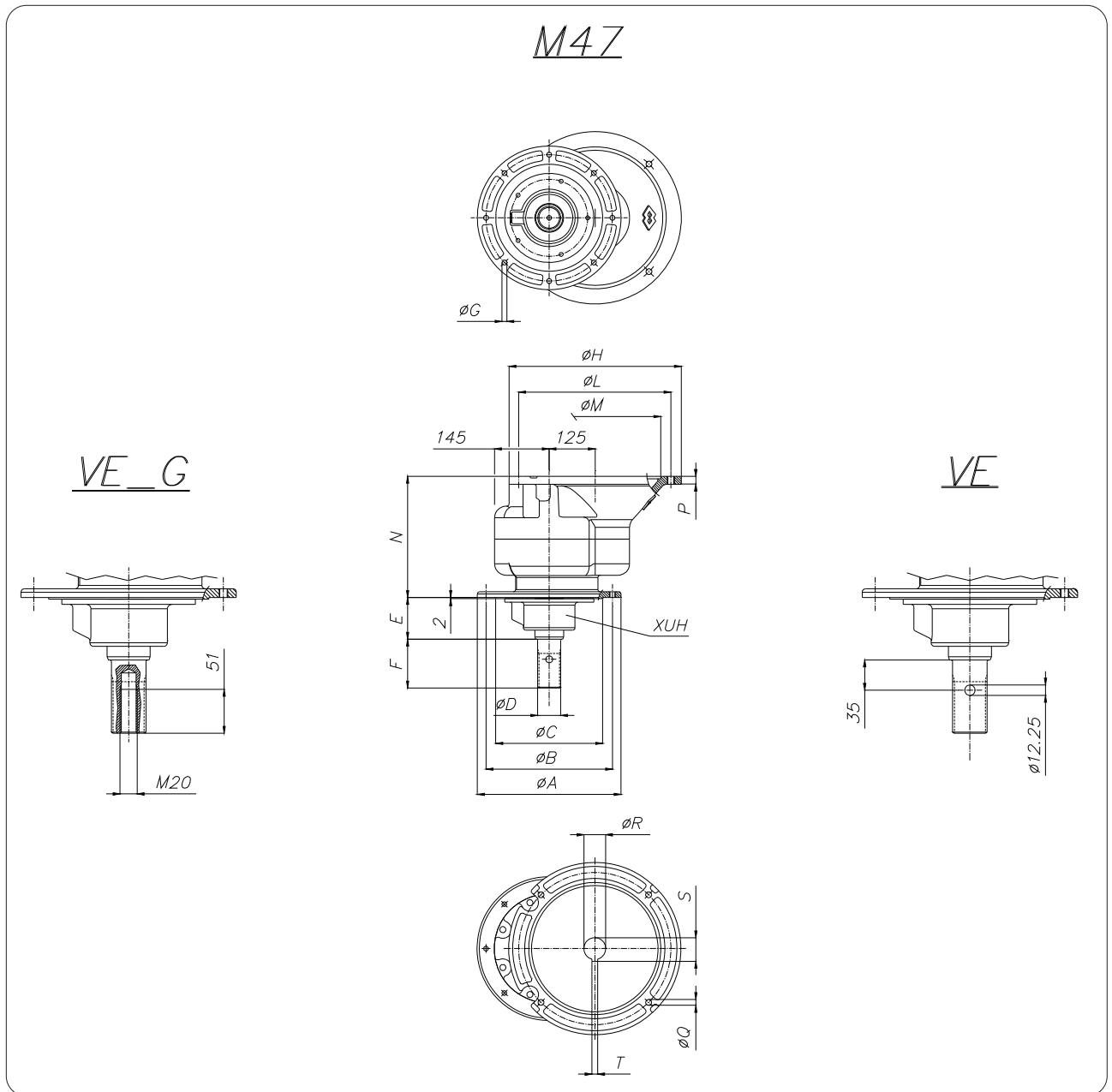
| Gear reducer<br>Testata motrice | Output<br>Uscita |   | $\varnothing$<br>Feeder - Coclea | $\varnothing A$ | $\varnothing B$ | $\varnothing C$ | $\varnothing D$<br>DIN 5482 | E    | F  | $\varnothing G$ |               |
|---------------------------------|------------------|---|----------------------------------|-----------------|-----------------|-----------------|-----------------------------|------|----|-----------------|---------------|
|                                 |                  |   |                                  |                 |                 |                 |                             |      |    | N°              | $\varnothing$ |
| <b>M45</b>                      | VE               | 1 | 168                              | 250             | 220             | 162             | 40 x 36                     | 72.5 | 85 | 8               | M 10          |
|                                 | VE               | 2 | 193                              | 250             | 220             | 186             | 40 x 36                     | 72.5 | 85 | 8               | M 10          |
|                                 | VE-VE_G          | 3 | 219                              | 275             | 250             | 210             | 40 x 36                     | 72.5 | 85 | 8               | M 10          |
|                                 | VE-VE_G          | 4 | 273                              | 330             | 305             | 265             | 40 x 36                     | 72.5 | 85 | 8               | M 10          |
|                                 | VE-VE_G          | 5 | 323                              | 405             | 370             | 315             | 40 x 36                     | 72.5 | 85 | 8               | M 10          |

| Motor size<br>Grand. motore | $\varnothing H$ | $\varnothing L$ | $\varnothing M$ | N   | P  | $\varnothing Q$ | $\varnothing R$ | S  | T  | Weight - Peso<br>kg |      |      |      |     |
|-----------------------------|-----------------|-----------------|-----------------|-----|----|-----------------|-----------------|----|----|---------------------|------|------|------|-----|
|                             |                 |                 |                 |     |    |                 |                 |    |    | VE1                 | VE2  | VE3  | VE4  | VE5 |
| <b>100 - 112</b>            | 250             | 215             | 180             | 210 | 14 | M 12            | 28              | 31 | 8  | 36.5                | 36.5 | 38.5 | 40.5 |     |
| <b>132</b>                  | 300             | 265             | 230             | 230 | 14 | M 12            | 38              | 41 | 10 | 40                  | 40   | 42.5 | 45.5 |     |
| <b>160</b>                  | 350             | 300             | 250             | 260 | 15 | M 16            | 42              | 45 | 12 | 44.5                | 44.5 | 46.5 | 49.5 |     |



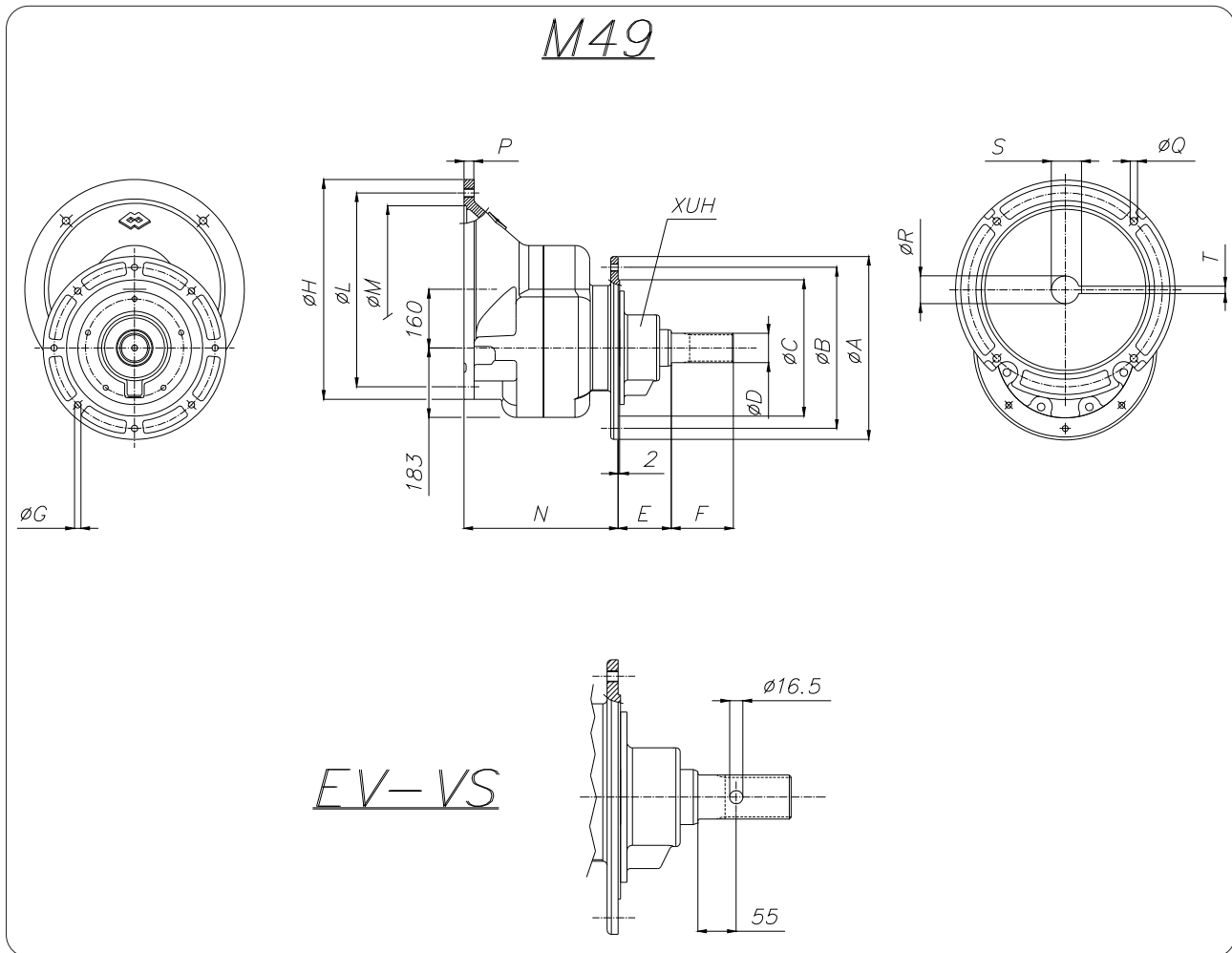
| Gear reducer<br>Testata motrice | Output<br>Uscita | N° | Ø Feeder - Coclea | Ø A | Ø B | Ø C | Ø D<br>DIN 5482 | E    | F  | Ø G |      |
|---------------------------------|------------------|----|-------------------|-----|-----|-----|-----------------|------|----|-----|------|
|                                 |                  |    |                   |     |     |     |                 |      |    | N°  | Ø    |
| <b>M47</b>                      | ES-EV-VS 1       | 1  | 168               | 250 | 220 | 162 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS 2       | 2  | 193               | 250 | 220 | 186 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS 3       | 3  | 219               | 275 | 250 | 210 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS 4       | 4  | 273               | 330 | 305 | 265 | 40 x 36         | 72.5 | 85 | 8   | M 10 |
|                                 | ES-EV-VS 5       | 5  | 323               | 405 | 370 | 315 | 40 x 36         | 72.5 | 85 | 8   | M 10 |

| Motor size<br>Grand. motore | Ø H | Ø L | Ø M | N   | P  | Ø Q  | Ø R | S    | T  | Weight - Peso<br>kg |     |     |     |     |
|-----------------------------|-----|-----|-----|-----|----|------|-----|------|----|---------------------|-----|-----|-----|-----|
|                             |     |     |     |     |    |      |     |      |    | ES1                 | ES2 | ES3 | ES4 | ES5 |
| 132                         | 300 | 265 | 230 | 230 | 14 | M 12 | 38  | 41   | 10 |                     |     | 56  | 60  |     |
| 160                         | 350 | 300 | 250 | 260 | 15 | M 16 | 42  | 45   | 12 |                     |     | 61  | 65  |     |
| 180                         | 350 | 300 | 250 | 275 | 15 | M 16 | 48  | 51.5 | 14 |                     |     |     |     |     |



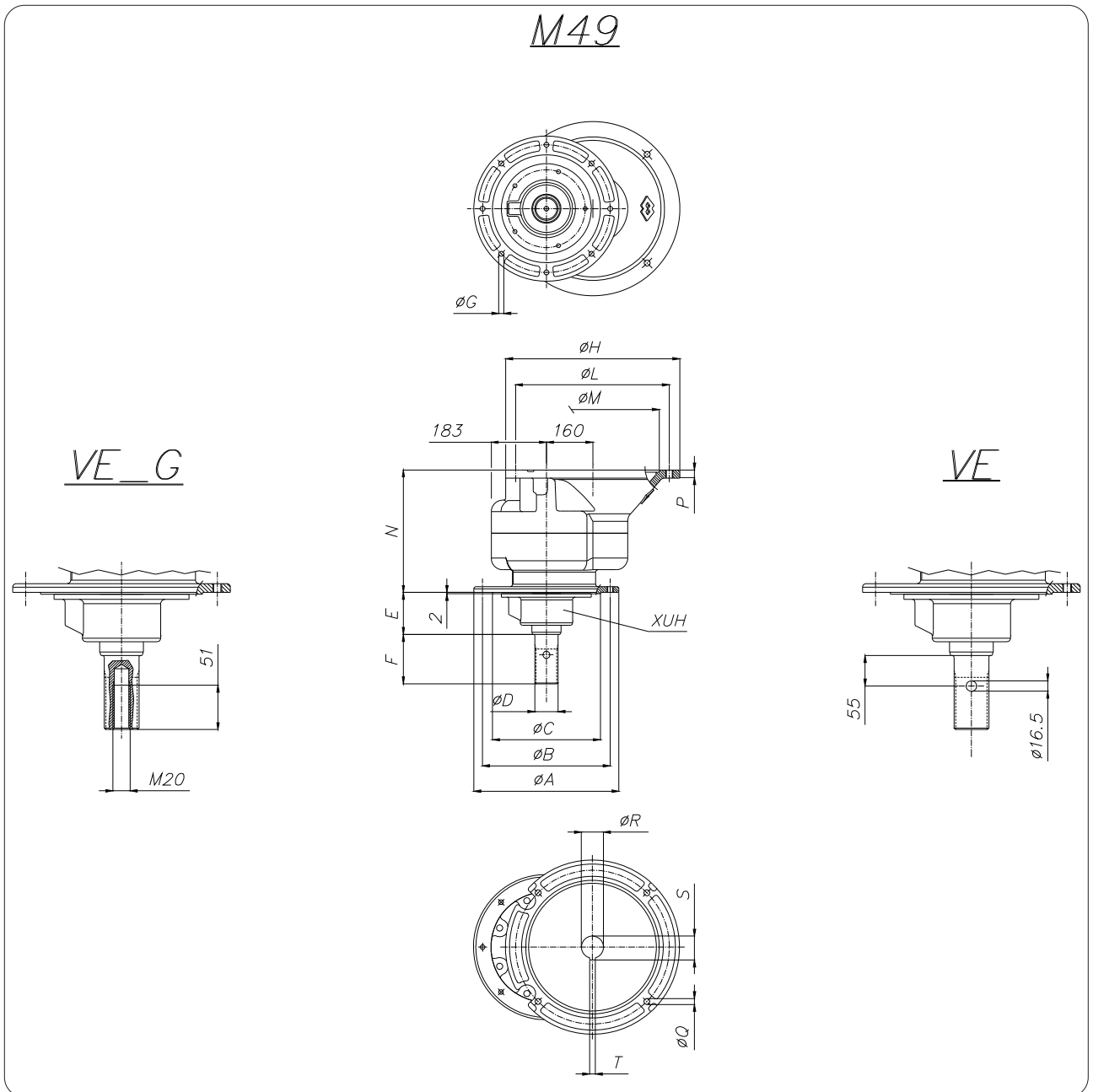
| Gear reducer<br>Testata motrice | Output<br>Uscita |   | Feeder - Coclea<br>$\phi$ | $\phi A$ | $\phi B$ | $\phi C$ | $\phi D$<br>DIN 5482 | E    | F  | $\phi G$ |        |
|---------------------------------|------------------|---|---------------------------|----------|----------|----------|----------------------|------|----|----------|--------|
|                                 |                  |   |                           |          |          |          |                      |      |    | N°       | $\phi$ |
| M47                             | VE               | 1 | 168                       | 250      | 220      | 162      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | VE               | 2 | 193                       | 250      | 220      | 186      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | VE-VE_G          | 3 | 219                       | 275      | 250      | 210      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | VE-VE_G          | 4 | 273                       | 330      | 305      | 265      | 40 x 36              | 72.5 | 85 | 8        | M 10   |
|                                 | VE-VE_G          | 5 | 323                       | 405      | 370      | 315      | 40 x 36              | 72.5 | 85 | 8        | M 10   |

| Motor size<br>Grand. motore | $\phi H$ | $\phi L$ | $\phi M$ | N   | P  | $\phi Q$ | $\phi R$ | S    | T  | Weight - Peso<br>kg |     |     |     |     |
|-----------------------------|----------|----------|----------|-----|----|----------|----------|------|----|---------------------|-----|-----|-----|-----|
|                             |          |          |          |     |    |          |          |      |    | VE1                 | VE2 | VE3 | VE4 | VE5 |
| 132                         | 300      | 265      | 230      | 230 | 14 | M 12     | 38       | 41   | 10 |                     |     | 56  | 60  |     |
| 160                         | 350      | 300      | 250      | 260 | 15 | M 16     | 42       | 45   | 12 |                     |     | 61  | 65  |     |
| 180                         | 350      | 300      | 250      | 275 | 15 | M 16     | 48       | 51.5 | 14 |                     |     |     |     |     |



| Gear reducer<br>Testata motrice | Output<br>Uscita | N° | ø Feeder - Coclea | ø A | ø B | ø C | ø D<br>DIN 5482 | E    | F   | ø G |      |
|---------------------------------|------------------|----|-------------------|-----|-----|-----|-----------------|------|-----|-----|------|
|                                 |                  |    |                   |     |     |     |                 |      |     | N°  | ø    |
| M 49                            | ES-EV-VS 3       | 3  | 219               | 275 | 250 | 210 | 60 x 55         | 72.5 | 110 | 8   | M 10 |
|                                 | ES-EV-VS 4       | 4  | 273               | 330 | 305 | 265 | 60 x 55         | 72.5 | 110 | 8   | M 10 |
|                                 | ES-EV-VS 5       | 5  | 323               | 405 | 370 | 315 | 60 x 55         | 72.5 | 110 | 8   | M 10 |

| Motor size<br>Grand. motore | ø H | ø L | ø M | N   | P  | ø Q  | ø R | S    | T  | Weight - Peso<br>kg |     |     |
|-----------------------------|-----|-----|-----|-----|----|------|-----|------|----|---------------------|-----|-----|
|                             |     |     |     |     |    |      |     |      |    | ES3                 | ES4 | ES5 |
| 160                         | 350 | 300 | 250 | 302 | 22 | M 16 | 42  | 45   | 12 |                     |     |     |
| 180                         | 350 | 300 | 250 | 302 | 22 | M 16 | 48  | 51.5 | 14 |                     | 103 | 112 |
| 200                         | 400 | 350 | 300 | 302 | 22 | M 16 | 55  | 59   | 16 |                     |     |     |



| Gear reducer<br>Testata motrice | Output<br>Uscita | 3 | $\varnothing$<br>Feeder - Coclea | $\varnothing A$ | $\varnothing B$ | $\varnothing C$ | $\varnothing D$<br>DIN 5482 | E    | F   | $\varnothing G$ |               |
|---------------------------------|------------------|---|----------------------------------|-----------------|-----------------|-----------------|-----------------------------|------|-----|-----------------|---------------|
|                                 |                  |   |                                  |                 |                 |                 |                             |      |     | N°              | $\varnothing$ |
| M 49                            | VE-VE_G          | 3 | 219                              | 275             | 250             | 210             | 60 x 55                     | 72.5 | 110 | 8               | M 10          |
|                                 | VE-VE_G          | 4 | 273                              | 330             | 305             | 265             | 60 x 55                     | 72.5 | 110 | 8               | M 10          |
|                                 | VE-VE_G          | 5 | 323                              | 405             | 370             | 315             | 60 x 55                     | 72.5 | 110 | 8               | M 10          |

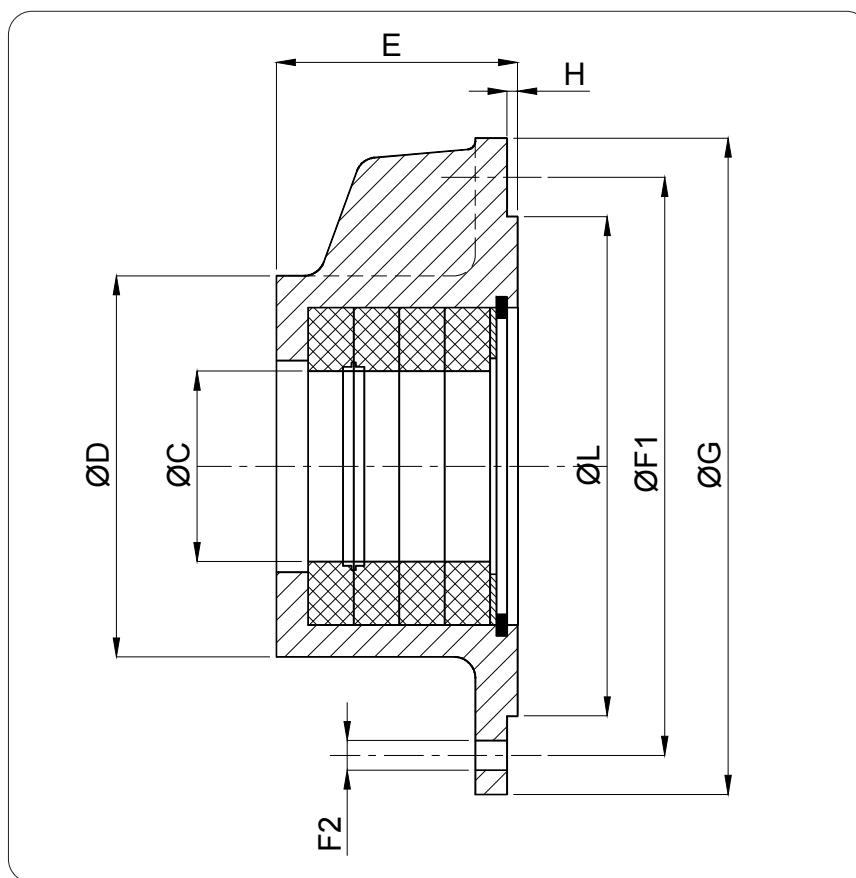
| Motor size<br>Grand. motore | $\varnothing H$ | $\varnothing L$ | $\varnothing M$ | N   | P  | $\varnothing Q$ | $\varnothing R$ | S    | T  | Weight - Peso<br>kg |     |     |
|-----------------------------|-----------------|-----------------|-----------------|-----|----|-----------------|-----------------|------|----|---------------------|-----|-----|
|                             |                 |                 |                 |     |    |                 |                 |      |    | VE3                 | VE4 | VE5 |
| 160                         | 350             | 300             | 250             | 302 | 22 | M 16            | 42              | 45   | 12 |                     |     |     |
| 180                         | 350             | 300             | 250             | 302 | 22 | M 16            | 48              | 51.5 | 14 |                     | 103 | 112 |
| 200                         | 400             | 350             | 300             | 302 | 22 | M 16            | 55              | 59   | 16 |                     |     |     |

**GEARBOX INLET SUITABLE TO B5 MOTOR - RIDUTTORE "M" ENTRATA P.A.M.**

| Type        | Motor size - Grandezza motore |   |    |   |     |    |     |     |   |   |     |   |     |   |     |
|-------------|-------------------------------|---|----|---|-----|----|-----|-----|---|---|-----|---|-----|---|-----|
|             | 80                            |   | 90 |   | 100 |    | 112 | 132 |   |   | 160 |   | 180 |   | 200 |
|             | A                             | B | S  | L | LR  | LH | M   | S   | M | L | M   | L | M   | L | M   |
| <b>M 41</b> | X                             | X | X  | X | X   | X  |     |     |   |   |     |   |     |   |     |
| <b>M 43</b> | X                             | X | X  | X | X   | X  | X   | X   |   |   |     |   |     |   |     |
| <b>M 45</b> |                               |   |    |   | X   | X  | X   | X   | X | X | X   | X |     |   |     |
| <b>M 47</b> |                               |   |    |   |     |    |     | X   | X | X | X   | X | X   | X |     |
| <b>M 49</b> |                               |   |    |   |     |    |     |     |   |   | X   | X | X   | X | X   |

**REAL GEAR RATIOS - RAPPORTI REALI DI RIDUZIONE**

| $i_n$     | <b>M 41</b> | <b>M 43</b> | <b>M 45</b> | <b>M 47</b> | <b>M 49</b> |
|-----------|-------------|-------------|-------------|-------------|-------------|
| <b>5</b>  | 5.154       | 4.923       | 4.846       | 5.154       | 4.923       |
| <b>6</b>  | 5.667       | 5.909       | 5.909       | 5.667       | 5.909       |
| <b>7</b>  | 6.363       | 6.600       | 6.600       | 6.900       | 6.600       |
| <b>10</b> | 9.909       | 9.200       | 9.900       | 9.600       | 9.200       |



| Code     | Ø C | Ø D | Ø F1 | F2 |    | Ø G | E  | H   | L   | kg  | For - Per             |
|----------|-----|-----|------|----|----|-----|----|-----|-----|-----|-----------------------|
|          |     |     |      | Ø  | n° |     |    |     |     |     |                       |
| XUH035_4 | 35  | 58  | 68   | 5  | 4  | 76  | 37 | -   | -   | 0.3 | M41-M43 (ES0)         |
| XUH050_4 | 50  | 90  | 134  | 9  | 5  | 155 | 57 | 2.5 | 118 | 0.5 | M43 (ES1-2-3) M45-M47 |
| XUH070_1 | 70  | 105 | 134  | 9  | 5  | 155 | 59 | 2   | 118 | 0.8 | M 49                  |

| Type sealing - Tipo tenuta |   | T. min | T. max |
|----------------------------|---|--------|--------|
| 2                          | For water - Per acqua                               | -40    | +120   |
| 3                          | For Medium temp. - Per Media temp.                  | -50    | +200   |
| 5                          | With chambre graisse - Con camera a grasso          | -40    | +120   |
| 6                          | Air Purged - Flussata ad aria                       | -40    | +120   |
| 7                          | At labyrinth - A labirinto                          | -40    | +200   |
| H                          | For filler high temp. - Per filler alta temperatura | -50    | +200   |
| J                          | Of series - Di serie                                | -40    | +120   |
| L                          | For Cold coal - Per carbone freddo                  | -40    | +120   |
| M                          | For Hot coal - Per carbone caldo                    | -50    | +200   |

| Type | Outlet |         | Inlet |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
|------|--------|---------|-------|------|------|-----|------|---|------|-----|------|------|-----|------|------|-----|-----|-----|---|---|--|
|      | ES     | Ø Screw | 80    |      | 90   |     | 100  |   | 112  | 132 |      |      | 160 |      | 180  |     | 200 | 225 |   |   |  |
|      |        |         | 0.55  | 0.75 | 1.1  | 1.5 | 2.2  | 3 | 4    | 5.5 | 7.5  | 9.2  | 11  | 15   | 18.5 | 22  | 30  | 37  |   |   |  |
| kg   |        |         |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
| M 41 | ES0    | 114     | 15.7  |      | 15.7 |     | 17.7 |   | /    |     |      | /    |     | /    |      | /   |     | /   |   |   |  |
|      |        | 139     |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
| M 43 | ES0    | 114     | /     |      | 1    |     | 1    |   | 1    | /   |      |      | /   |      | /    |     | /   |     | / |   |  |
|      |        | 139     |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
|      | ES1    | 168     | 24    |      | 24   |     | 26   |   | 29   |     |      | /    |     | /    |      | /   |     | /   |   |   |  |
|      | ES2    | 193     |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
|      | ES3    | 219     | /     |      | 26.5 |     | 28.5 |   | 31   |     |      | /    |     | /    |      | /   |     | /   |   |   |  |
| M 45 | ES1    | 168     | /     |      | /    |     | 36.5 |   | 40   |     |      | 44.5 |     | /    |      | /   |     | /   |   |   |  |
|      | ES2    | 193     |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
|      | ES3    | 219     |       |      |      |     | 38.5 |   | 42.5 |     |      | 46.5 |     |      |      |     |     |     |   |   |  |
|      | ES4    | 273     |       |      |      |     | 40.5 |   | 45.5 |     |      | 49.5 |     |      |      |     |     |     |   |   |  |
|      | ES5    | 323     |       |      |      |     | 50   |   | 54   |     |      | 58   |     |      |      |     |     |     |   |   |  |
| M 47 | ES1    | 168     | /     |      | /    |     | /    |   | /    |     | 1    |      |     | 1    |      | 1   |     | /   |   | / |  |
|      | ES2    | 193     |       |      |      |     |      |   |      |     |      |      |     |      |      |     |     |     |   |   |  |
|      | ES3    | 219     |       |      |      |     |      |   |      |     | 56   |      |     | 61   |      | 1   |     |     |   |   |  |
|      | ES4    | 273     |       |      |      |     |      |   |      |     | 60   |      |     | 65   |      | 1   |     |     |   |   |  |
|      | ES5    | 323     |       |      |      |     |      |   |      |     | 67.5 |      |     | 72.5 |      | 1   |     |     |   |   |  |
| M 49 | ES3    | 219     | /     |      | /    |     | /    |   | /    |     | /    |      |     | 1    |      | 1   |     | 1   |   |   |  |
|      | ES4    | 273     |       |      |      |     |      |   |      |     |      |      |     | 1    |      | 103 |     | 1   |   |   |  |
|      | ES5    | 323     |       |      |      |     |      |   |      |     |      |      |     | 1    |      | 112 |     | 1   |   |   |  |





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