CRIVELLIN PROGETTAZIONI s.r.I.

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"DIFFERENTIAL"

Gearing calculation for gear train the differential.

User manual

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Presentation

The program calculates gear train ratio of the differential by:

hobbing machines, grinding machines, threading machines, bevel cutting, Basic rack machine and milling racks.

Normally calculated 4 wheels but if the ratio is very low, the program calculates with 6 wheels.

The calculation can be performed with precision to the 10th decimal place. By default, the program proposes the calculation with 6 digits.

If a result is not found, the program recalculates down by one digit up to the minimum (3 digits).

 A^*C Results with 4 wheels, ratio ------ B^*D (A-C = Conductive, B-D = Driven)



A*C*E Results with 6 wheels, ratio.= ----------B*D*F





Start the program window

Differenziale			6
🗖 Hobs			
🗏 Grinding machine 1			
🗏 Grinding machine 2			
🗏 Threading machine			
Conical toothing machines			
Conical toothing "MODUL"			
Combed toothing machines			
Rack milling machines			
🔲 Tangential			
🖻 Reishauer			
OK New			
Machine setup Del. machine			
General			
Setup			
Information			
Manual			
Backup machines			
Restore machines data			

Fig. 1

General

Selecting "General" from Figure 1 window, you can make the calculation 4 gears, given a report and a set of wheels without bond with no machine.

bifferential				×
File Help				
Setup	Calculati	ons	Results	General
Ratio Precision	0 6		•	
4 Gears		6 Ge	ars	
Min: 0 Max: 0		Min:	0	
From 20	to	E F	eset	
Insert one gear)K with Z=	0		
Delete ge	ars with Z=	0		
Dele	ete all gears se	lected		Calculate
				Return

01

Settings

By selecting "Settings" you can set the unit of measurement

the angle in decimal degrees or degrees, minutes, seconds, and the language for using the program.

The button "Save" makes this valid setting every time you launch the program.



FIG.3

Backup data of the machines

Save data file machines.

Charging machine data

Upload the data previously saved .

Choosing a machine

Appears in the window below. Select a machine. At this point you can choose the options on the buttons:

"**OK**" continues with the calculation

"NEW" offers a window we'll see where you can enter values to store a new car of the same family.

For the family it is meant that the formula for calculating the ratio is the same, you can only enter the constant.

🐌 Differenziale			x
V Hobs	Pellegrini	Cost=10	
Grinding machine 1	Donini	Cost=14.854	
Grinding machine 2	Demak 1	Cost=7.6394	
Threading machine	Demak 2	Cost=3.8197	
	DEMM	Cost=5.729578	
Conical toothing machines	MAC 21	Cost=3.819/	
Conical toothing "MODUL"	MAC 26	Cost=25 4654	
Combed toothing machines	B 14	Cost=10.185916	
Rack milling machines	MAC 58	Cost=1.6114	=
	CIMA	Cost=5.96829	
angential	GSP	Cost=7.957747	
Reishauer	MAC 115	Cost=3.8197	
OK New	DEMAK DK480	Cost=6.365198	
	PFAUTER P251	Cost=2.8547644	
Machine setup Del. machine	PFAUTER P160	Cost=1.909859	
General	CIMA P3	Cost=2.984148	
	TESIA dPG/dPGS 1 TESTA dPC/dPGS 2	Cost=1 0106	
Setup	TESTA APFW 1	Cost=10.1062	
Information	TESTA APFW 2	Cost=2.5266	
Manual	PFAUTER P250	Cost=2.864789	
Manual	DEMAC	Cost=3.816	
Backup machines	TOS 6	Cost=5.96831	
Restore machines data	TOS 12	Cost=8.25059	-

Button "Setup" or "New"

"Machine name":

Enter the name of the machine.

"Constant":

Enter the numeric value of the constant.

"Compile a list":

Fill in the 1st **"BY"** field with the smaller wheel number of teeth. fill in the 2 ° field **"TO"** with the number of teeth on the large wheel.

Press the "OK" button in the right window you will be compiled a list of the wheels.

"Reset":

Remove all the wheels that appear on the list.

"Insert a time wheel":

Write the number of teeth in the field and press the "Return" key on the keyboard.

"Remove all the wheels with Z =":

Select the wheels on the list to be deleted by selecting the BUTTON

"Save":

Stores the setting just made.

"Return":

Go back to the previous window.

e Help			
Setup	Calculations	Results	General
Name of the machine			
Formu sin(AngEl)*Cos	t/(Mod*PrincUt)		
From 20	to OK	Reset	
Insert one gea	r with Z=		
Delete g	jears with Z=		
De	elete all gears selected		Save
			Deturn

Data input window

👏 Differential		×
	Insert ratio	
	Insert data	
	Return	

FIG.6

"Input value":

You may choose to enter only the previously calculated ratio by other means (see figure 7).

"Input data"

Inputting data and the ratio is calculated by the pro-gramme (see Figure 8).

"Back":

Back of a window ...

"Introduction ratio"

Enter the value of the report in the "Report" (ratio between the drive wheels divided the driven wheels).

In the window you can see in advance the minimum and maximum possible with the available wheels.

If you want to have a calculation accuracy higher than that set by default, select the value in the field below: "Decimal".

-----Limitations------

"Fxed wheel A":

Select the picture, you will see the list of wheels, select the desired wheel. You can set a fixed driving gear.

"Fixed wheel B":

Select the picture, you will see the list of wheels, select the desired wheel. You can set a fixed driven wheel.

"Sum minimum teeth A + B":

If the horse's head does not allow you to mount small wheels: select the picture, you will see a field where you enter the value.

"Calculate" starts the calculation.

"Return": go back one box.

🍗 Differentia	al	and here					×
File Help						_	
	Setup	Calculatio	ns	Re	esults	Ŭ G€	eneral
	Machine:	Demak 2		4 Gears Min:	0,04242	Max: 23,5	714
				6 Gears Min:	0,00952		
		Ratio	0				
		Precision	6		-		
						Datio-	A*C
						rtatio-	B*D
						Ratio=	A*C*E
							B-D-F
	🗖 G	ear A fixed		🗖 Mi	inimal sum o	f teeth	
	🗆 G	ear D fixed					
		Calculate			Return		

"Enter data"

The input box allows you to enter the essential data to calculate the ratio and the wheels.

The "Report" field is disabled. Will be automatically filled in just inserted the module,

the N ° threads of the hob and the helix angle.

Enter values in the fields below as required.

The "G" and "GPS" buttons allow you to enter data in sessadecimali degrees or in degrees, minutes, seconds. Limitations: are the same as on page 7.

Differential	eth of the hol	and the helis angle		X
Setup Calculation		Resul	lts	General
Machine: Dema	k 2	4 Gears Min: 0 6 Gears Min: 0),04242 Max:),00952	23,5714
	Ratio)		
F	Precision	6	•	
Input data				A*C
Normal module	0		Ratio	=
N* of hob spirals	0	_		
Helix angle	0	CDC	Ratio	= <u>A*C*E</u>
Gear A	fixed	Mini	mal sum of teeth	B-D-F
Gear D	fixed			
	Calculate		Return	

Results window

The results appear from the window below; you can print or save to disk. If you choose the "Print Selection" option prints only the wheels that interest you.

The program calculates the difference (delta) between the searched ratio and that found ratio.

It also calculates the helix angle actually achievable with the wheels choices.

In the case of threading calculates the actual axial pitch and so on also to other machines.

```
х
🍗 Report
                                                                            ۸
   Searched value
                                 : 1.90985
   Precision : 5
   Input data :
                                                                            =
  Module: : 1
   Helix angle:
                      : 30 (30°0'0'')
   N° of hob spirals: : 1
   Results:
              R = (A*C) / (B*D)
         в
              С
                   D
                       Ratio
                                 Delta ratio Actual helix angle
    А
                        1.9098412698 .0000087301 ( 29° 59' 59'')
    32
         21
              94
                   75
                                                   (29°59'59'')
    32
         25
              94
                   63
                        1.9098412698 .0000087301
                                                   (29°59'59')
(29°59'59')
(29°59'59')
    32
         35
              94
                   45
                        1.9098412698 .0000087301
    32
         45
              94
                   35
                        1.9098412698
                                       .0000087301
 Print selections
                        Print
                                       Save
```