

_axis	9	d	a	q
	0,	dı	0	-90
2	<u>0</u> ،	0	a,	0
3	93	0	Q2	0

D-H TABLE

$$\begin{bmatrix}
coi\theta_1 \cos \theta_2 & - \cos \theta_1 \sin \theta_2 & - \sin \theta_1 & c_1 \cos \theta_2 \cos \theta_2 \\
coi\theta_1 \cos \theta_2 & - \sin \theta_1 \sin \theta_2 & coi\theta_1 & c_1 \sin \theta_1 \cos \theta_2
\end{bmatrix}
\begin{bmatrix}
coi\theta_3 & - \sin \theta_3 & 0 & q_2 \cos \theta_3 \\
sin\theta_1 \cos \theta_2 & - \sin \theta_1 \sin \theta_2 & coi\theta_1 & c_1 \sin \theta_1 \cos \theta_2
\end{bmatrix}
\begin{bmatrix}
coi\theta_3 & - \sin \theta_3 & 0 & q_2 \cos \theta_3 \\
sin\theta_3 & coi\theta_3 & 0 & coi\theta_3
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coi\theta_3 & - \cos \theta_3 & 0$$

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Pz = -az sin bz cos bz - a, sinbz+d, -az cosbz sin bz
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 172737= [ cox8, cox8, cox83
                                                                                                                                                                                                                                                                                                                                                                                                                                        Py = a, sin 0, co, 0 + a, sin 6, co, 0, co, 0, -a, sin 6, sin 0, sin 0,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Px - 42 cos 6, cos6, cos6, - 02 cos6, sin Orsin 8, + a, cos6, cos 6,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = a, (0) 6, (0) ((),+(),) + a, (0) 6, (0) 0,
                                                                                                                                                                                                                                                                                                                                                                                                                = Q, sin 8, cos 8 + Q = sin 8, cos (8+ 6)
                                                                                                                                                                                                                                                                                                                                                                                    = Q, Sin B. coi B. + Qr sin B, Coi Bra
                                                                                                                                                                                                                                                           = - as sin (Os+0) - as sin B+d,
                                                                                                                                                                                                                                                                                           z - az sin Oz cos ez - a, sin Oztd, - az cos Oz sin Oz
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  a, cos 0, cos 0, + a, cos 0, cos 0,
<del>2000, cor0,</del>
                                                                                                                                                                                                                       - 92 8in 823 - a, sin 8, +d,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    sin 6, costs - sint, sint, sint,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 - sing_ cos 03 - coses sings
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    - sin & isin by Love - sin b, sin b, cab,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ~ cosO, sin 02 sin 03
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Sin Basin By - Couba cou Ba
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            : Px + Py + (Pz-di) = r2+h2 = a,2+a,2 + 2a,a,co, 0,
                                                                                                                                                                                                                                                                                                                                                                           (2+h2 = Px2 + Py2 + (Pz-h)2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         r = 0,000 + 02 000 823
                                                                                                                                                                                                                                                                                                                                                                                                                                                            h= Pz-d,
                                                       (050+5in20=1) sin 0++ (1-cos20) 12
                                                                                                                                                                                                                                                                                                                                                                                                                              = - 025in 823 - 0, sin 82
                                                                                                                              03 = Pm2 +Py2 + (P2-di)1 - 012+02
                                                                                                                                                                                                                                     = 0, 10, + 20,01 cos ($4 63-82)
                                                                                                                                                                                                               = q,2+ q,2 + 2 a, a, co 0,
                                                                                                                                                                                                                                                                                       = a, [ cos 1 6 1 + sin 2 6 2] + a 2 [ co 2 6 23 + sin 2 6 23] + 20, 12
                                                                                                                                                                                                                                                                                                                                                = (1, (w2 6, + 9, co) 823 + 29,9, (0> 82 (0) 823 + 9,2 sin 8) 4
                                                                                                                                                                                                                                                                                                                       + 20,02 sin 82 sin 82 + 0,7 617 623
                    : 63 - ATAND (68,6 in B3, CO) B3) #
                                                                                                                                                                                                                                                                  + 20,0, [ cos 02 cos 023 + 8in 02 sin 023]
                                                                                                          20,02
```

70

f = a, cos 82 4 assing, sinds + ascar Oscar 02 h = -a.sin 02 - azcadisin 03 - azsin 02 car 02 let x = a, cos 0, +a, y = azsinbs r = a, coso, - assinfisings + ascorbicosos = - y sin 0, + x cos 0, n = - a, sin 0, - a, co, 0, sin 0, - 4, sin 0, co, 0, = -4 cos02 - n sin 02 $H = \sqrt{n^2 + u^2}$ d: tan $(\frac{9}{n})$.. M= H cosd ; y= Hsind r = H cos & cos 0 = - Hsindsin 82 # # = cos (4+0) h = - It cos dsin02 - Hsindcos 02 $\frac{h}{h} = -\sin(\phi + \theta_2)$ $\frac{h}{h} = \frac{-\sin(d+\theta_2)}{\cos^2(d+\theta_2)} = -\tan(d+\theta_2)$ tan (d+0)=-1/r d+02: ATAN2 (-h/r) :. 02 - ATAN2 (-1/r) - ATAN2 (4)

= ATANZ (Py, Pm) &

: 6, = ATAN 2 (Py/Pn) &

Scanned by CamScanner

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0.0485
                                                                                                                                                                                                                                                                                                                                                                                                                                     01213T. (00(30)(0)(50)60(85)
                                                                        the gripper will move to
2 = 2.06.10
                                               2006
                           1820 11 - + A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 d. = 10.4 cm , a1 = 3.5 cm , a1= 3.0 cm
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                                                                                                                                                                                                                                                                    - 8 sin (50) cos (85) - 3.5 sin (50) + 10.4 - 8 cos (50) sin (85)
                                                                                                                                                                                                                                                                                         3.5 sin(30) + 8 sin(30) ws (50) ws (85) - 8 fin (30) sin (50) sin (85)
                                                                                                                                                                                                          -0.6609
                                                                                                                                                                             -0.3536
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                                                                                                                                            7.0620
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                                                                                                                                                                                                                                                                                                                                                                                                                                     (30)
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4350m. . 6, = 30° , 6, = 50° , 6, = 85°