

Rotary Shafts D Tolerance h9 (Cold-drawn) / h7 (Ground) / g6 (Ground)

One End Stepped, One End Threaded

■ Select from h9 (Cold-drawn), h7 (Ground) and g6 (Ground) for your applications. Furthermore, h7 or g6 can be selected for P part tolerance of h9 (Cold-drawn).

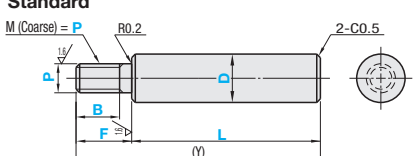


RoHS 10

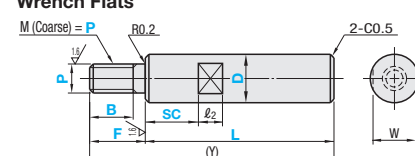
Type		Tolerance		Material	Surface Treatment
Standard	Wrench Flats	D	P		
① SFRMHN PSFRMHN SSFRMHN	SFRMHNS PSFRMHNS SSFRMHNS	h9 (Cold-drawn)	h7	EN 1.1191 Equiv.	Black Oxide
② SFRMGN PSFRMGN SSFRMGN	SFRMGNS PSFRMGNS SSFRMGNS			EN 1.4301 Equiv.	Electroless Nickel Plating
③ SFRHN PSFRHN SSFRHN	SFRHNS PSFRHNS SSFRHNS			EN 1.1191 Equiv.	Black Oxide
④ SFRN PSFRN SSFRN	SFRNS PSFRNS SSFRNS	h7 (Ground)	h7	EN 1.4301 Equiv.	Electroless Nickel Plating
⑤ HFRN PHFRN	HFRNS PHFRNS			EN 1.1191 Equiv.	Black Oxide
				EN 1.4301 Equiv.	Electroless Nickel Plating

① Surface roughness of D part for h9 (Cold-drawn) is $\frac{6.3}{\sqrt{R_a}}$.
② Surface roughness for h7 (Ground) and g6 (Ground) is $\frac{1.6}{\sqrt{R_a}}$.

Standard



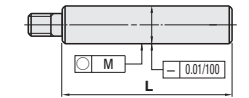
Wrench Flats



Dimensional Tolerances

Dimension over or Less	Tolerance
2 6	±0.1
6 30	±0.2
30 120	±0.3
120 400	±0.5
400 800	±0.8

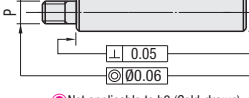
Circularity and Straightness



Circularity of Part D

D over or Less	Circularity M
5 13	0.004
13 20	0.005
20 40	0.006
40 50	0.007

Concentricity and Perpendicularity



① D tolerance h9 (Cold-drawn) / P tolerance h7 ② D tolerance h9 (Cold-drawn) / P tolerance g6

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment	W	ℓ ₂	(Y) max.
Standard	Type	D	L	F		Wrench Flats Type only			
① D part h9 / P part h7 SFRMHN PSFRMHN SSFRMHN	① D part h9 / P part h7 SFRMHNS PSFRMHNS SSFRMHNS	6	20.0~295.0	5 ≤ F ≤ Px7	When P ≤ 6 B ≤ Px3 & B ≤ F-2	3 4 5 3 4 5 6 4 5 6 8	5	300	
(D6 is not available for SSFRMHN.)	(D6 is not available for SSFRMHNS.)	8	20.0~395.0		When P = 8 or 10 B ≤ Px3 & B ≤ F-3	5 6 8 10 5 6 8 10 12	7	400	
② D part h9 / P part g6 SFRMGN PSFRMGN SSFRMGN	② D part h9 / P part g6 SFRMGNS PSFRMGNS SSFRMGNS	10	20.0~495.0		When P ≥ 12 B ≤ Px3 & B ≤ F-5	6 8 10 12 16 8 10 12 16 20	8	500	
(D6 is not available for SSFRMGN.)	(D6 is not available for SSFRMGNS.)	12	25.0~595.0			8 10 12 16 20 24	10	600	
		15	25.0~695.0				13	700	
		20	30.0~795.0				17		
		25	30.0~795.0				22		
		30	30.0~795.0				27	800	
		35	40.0~795.0				30		

③ h7 (Ground)

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment	W	ℓ ₂	(Y) max.
Standard	Type	D	L	F		Wrench Flats Type only			
SFRHN	SFRHNS	6	20.0~295.0	5 ≤ F ≤ Px7	When P ≤ 6 B ≤ Px3 & B ≤ F-2	3 4 5 3 4 5 6 4 5 6 8	5	300	
PSFRHN	PSFRHNS	8	20.0~395.0		When P = 8 or 10 B ≤ Px3 & B ≤ F-3	5 6 8 10 5 6 8 10 12	7	400	
SSFRHN	SSFRHNS	10	20.0~495.0		When P ≥ 12 B ≤ Px3 & B ≤ F-5	6 8 10 12 16 8 10 12 16 20	8	500	
		12	25.0~595.0			8 10 12 16 20 24	10	600	
		15	25.0~695.0				13	700	
		17	30.0~795.0				14		
		20	30.0~795.0				17		
		25	30.0~795.0				22		
		30	30.0~795.0				27	800	
		35	40.0~795.0				30		
		40	40.0~795.0				36		
		50	40.0~795.0				41	20	

④ g6 (Ground)

Part Number		0.1mm Increment		1mm Increment	P (Coarse) Selection	1mm Increment	W	ℓ ₂	(Y) max.
Standard	Type	D	L	F		Wrench Flats Type only			
SFRN	SFRNS	6	20.0~295.0	5 ≤ F ≤ Px7	When P ≤ 6 B ≤ Px3 & B ≤ F-2	3 4 5 3 4 5 6 4 5 6 8	5	300	
PSFRN	PSFRNS	8	20.0~395.0		When P = 8 or 10 B ≤ Px3 & B ≤ F-3	5 6 8 10 5 6 8 10 12	7	400	
SSFRN	SSFRNS	10	20.0~495.0		When P ≥ 12 B ≤ Px3 & B ≤ F-5	6 8 10 12 16 8 10 12 16 20	8	500	
(D13, 16, 18 and 22 are not available for SSFRN.)	(D13, 16, 18 and 22 are not available for SSFRNS.)	12	25.0~595.0			8 10 12 16 20 24	10	600	
*HFRN (Only * marked sizes are available.)	*HFRNS (Only * marked sizes are available.)	15	25.0~695.0				13	700	
*PHFRN (Only * marked sizes are available.)	*PHFRNS (Only * marked sizes are available.)	16	25.0~795.0				14		
		17	30.0~795.0				17		
		18	30.0~795.0				22		
		20	30.0~795.0				27	800	
		22	30.0~795.0				30		
		25	30.0~795.0				36		
		30	30.0~795.0				41	20	
		35	40.0~795.0						
		40	40.0~795.0						
		50	40.0~795.0						

⚡ When D ≤ P-2, chamfer C at the step is 0.2 or less.

Ordering Example

① D part h9 / P part h7
③ h7 (Ground) with Wrench Flat

Part Number - L - F - B - P - SC

SFRMHN30 - 250 - F30 - B8 - P10
SFRHNS25 - 200 - F25 - B15 - P12 - SC30

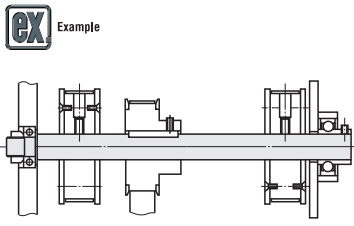
① D tolerance h9 (Cold-drawn) / P tolerance h7 ② D tolerance h9 (Cold-drawn) / P tolerance g6

Type	SFRMHN, SFRMGN (EN 1.1191 Equiv., Black Oxide)								PSFRMHN, PSFRMGN (EN 1.1191 Equiv., Electroless Nickel Plating)								SSFRMHN, SSFRMGN (EN 1.4301 Equiv.)							
	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
D	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0
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③ h7 (Ground) ④ g6 (Ground)

Type	SFRHN, SFRN (EN 1.1191 Equiv., Black Oxide)								PSFRHN, PSFRN (EN 1.1191 Equiv., Electroless Nickel Plating)								SSFRHN, SSFRN (EN 1.4301 Equiv.)							
	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
D	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0
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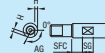
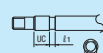
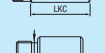
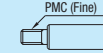
Type	HFRN (EN 1.7220 Equiv. Hardness 30~35HRC, Black Oxide)								PHFRN (EN 1.7220 Equiv. Hardness 30~35HRC, Electroless Nickel Plating)							
	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1	Min. L	L50.1	L100.1	L150.1	L200.1	L300.1	L400.1	L600.1
D	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0	50.0	100.0	150.0	200.0	300.0	400.0	600.0	795.0
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Alterations

Part Number - L - F - B - P - SC - (KC, WKC, FC-etc.)

SSFRHNS10 - 150 - F10 - B5 - P5 - SC20 - PKC

Alterations	Keyway	Set Screw Flat	2 Set Screw Flats (Angle Specified)	Slit Cam Groove	Undercut / L Dimension Tolerance	Keyway on Shaft End / Concentricity	Fine Thread																																																																																																																																																																																																																																																																																																																																																																																																																	
	• 1 Keyway: KC  • 2 Keyways: WKC 	• 1 Set Screw Flat: FC  • 2 Set Screw Flats: WFC 																																																																																																																																																																																																																																																																																																																																																																																																																						
Code	KC, WKC	FC, WFC	SFC	UC	PC, LKC	PKC, CKC	PMC																																																																																																																																																																																																																																																																																																																																																																																																																	
Spec.	KC: Adds a keyway. <u>Ordering Code</u>: KC50-A10 WKC: Adds two keyways. <u>Ordering Code</u>: WKC50-C8-K40-E10 ⚡ KC, A, WKC, C, K, E = 1mm Increment ⚡ A, E, C, U10 ⚡ For Keyway Details, refer to P820. ⚡ If 3 keyways are required, use both KC and WKC. ⚡ When the keyway position is less than 1mm away from the end face, R is not applied. 	FC: Adds 1 set screw flat. <u>Ordering Code</u>: FC10-G3 WFC: Adds 2 set screw flats. <u>Ordering Code</u>: WFC10-J3-W10-V3 ⚡ FC, G, WFC, J, W, V = 1mm Increment ⚡ A, G, V, G50 <table border="1"><thead><tr><th>D</th><th>H</th></tr></thead><tbody><tr><td>6-17</td><td>1</td></tr><tr><td>18-40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></tbody></table>	D	H	6-17	1	18-40	2	50	3	Adds a set screw flat at any desired angle besides the datum plane (D°). SFC: SG= 1mm Increment AG = 15° Increment ⚡ SG=50 <u>Ordering Code</u>: SFC10-SG3-AG90 <table border="1"><thead><tr><th>D</th><th>H</th></tr></thead><tbody><tr><td>6-17</td><td>1</td></tr><tr><td>18-40</td><td>2</td></tr><tr><td>50</td><td>3</td></tr></tbody></table> ⚡ When combined with other alterations, ±2 degree phase differential may occur.	D	H	6-17	1	18-40	2	50	3	Adds a slit cam groove. UC = 1mm Increment <u>Ordering Code</u>: UC10 ⚡ UC+δ<L ⚡ UC=1 ⚡ Not applicable to D13 or more. <table border="1"><thead><tr><th>D</th><th>d</th><th>δ1</th></tr></thead><tbody><tr><td>6</td><td>5</td><td>4</td></tr><tr><td>8</td><td>7</td><td>4</td></tr><tr><td>10</td><td>8</td><td>5</td></tr><tr><td>12</td><td>10</td><td>5</td></tr></tbody></table>	D	d	δ1	6	5	4	8	7	4	10	8	5	12	10	5	PC: Adds an undercut on P. <u>Ordering Code</u>: PC ⚡ For detailed undercut dimensions, refer to P82. ⚡ F-B=0.02 ⚡ Not applicable when D=P. LKC: Changes L dimension tolerance. <u>Ordering Code</u>: LKC ⚡ L<500→L±0.05 L≥500→L±0.1	PKC: Adds a keyway on the shaft end P. <u>Ordering Code</u>: PKC10 ⚡ PKC = 1mm Increment ⚡ PKC=50 PKC=FIT) ⚡ Not applicable to P5 or less. ⚡ Not applicable to P5 or less. CKC: Changes the concentricity to 0.002. <u>Ordering Code</u>: CKC ⚡ Applicable within dimension L range in the table below. <table border="1"><thead><tr><th>D</th><th>Lmax</th></tr></thead><tbody><tr><td>6-22</td><td>450</td></tr><tr><td>25-50</td><td>600</td></tr></tbody></table> ⚡ Not applicable to D part of n0 (Cold-drawn).	D	Lmax	6-22	450	25-50	600	Changes threads to Fine Thread in the table below. <u>Ordering Code</u>: PMC20 <table border="1"><thead><tr><th colspan="2">D</th><th colspan="2">PMC</th></tr></thead><tbody><tr><td>6</td><td>3</td><td>4</td><td>5</td></tr><tr><td>8</td><td>3</td><td>4</td><td>5</td></tr><tr><td>10</td><td>4</td><td>5</td><td>6</td></tr><tr><td>12</td><td>5</td><td>6</td><td>8</td></tr><tr><td>15</td><td>5</td><td>6</td><td>8</td></tr><tr><td>16</td><td>5</td><td>6</td><td>8</td></tr><tr><td>17</td><td>5</td><td>6</td><td>8</td></tr><tr><td>18</td><td>5</td><td>6</td><td>8</td></tr><tr><td>19</td><td>5</td><td>6</td><td>8</td></tr><tr><td>20</td><td>5</td><td>6</td><td>8</td></tr><tr><td>21</td><td>5</td><td>6</td><td>8</td></tr><tr><td>22</td><td>5</td><td>6</td><td>8</td></tr><tr><td>23</td><td>5</td><td>6</td><td>8</td></tr><tr><td>24</td><td>5</td><td>6</td><td>8</td></tr><tr><td>25</td><td>5</td><td>6</td><td>8</td></tr><tr><td>26</td><td>5</td><td>6</td><td>8</td></tr><tr><td>27</td><td>5</td><td>6</td><td>8</td></tr><tr><td>28</td><td>5</td><td>6</td><td>8</td></tr><tr><td>29</td><td>5</td><td>6</td><td>8</td></tr><tr><td>30</td><td>5</td><td>6</td><td>8</td></tr><tr><td>31</td><td>5</td><td>6</td><td>8</td></tr><tr><td>32</td><td>5</td><td>6</td><td>8</td></tr><tr><td>33</td><td>5</td><td>6</td><td>8</td></tr><tr><td>34</td><td>5</td><td>6</td><td>8</td></tr><tr><td>35</td><td>5</td><td>6</td><td>8</td></tr><tr><td>36</td><td>5</td><td>6</td><td>8</td></tr><tr><td>37</td><td>5</td><td>6</td><td>8</td></tr><tr><td>38</td><td>5</td><td>6</td><td>8</td></tr><tr><td>39</td><td>5</td><td>6</td><td>8</td></tr><tr><td>40</td><td>5</td><td>6</td><td>8</td></tr><tr><td>41</td><td>5</td><td>6</td><td>8</td></tr><tr><td>42</td><td>5</td><td>6</td><td>8</td></tr><tr><td>43</td><td>5</td><td>6</td><td>8</td></tr><tr><td>44</td><td>5</td><td>6</td><td>8</td></tr><tr><td>45</td><td>5</td><td>6</td><td>8</td></tr><tr><td>46</td><td>5</td><td>6</td><td>8</td></tr><tr><td>47</td><td>5</td><td>6</td><td>8</td></tr><tr><td>48</td><td>5</td><td>6</td><td>8</td></tr><tr><td>49</td><td>5</td><td>6</td><td>8</td></tr><tr><td>50</td><td>5</td><td>6</td><td>8</td></tr><tr><td>51</td><td>5</td><td>6</td><td>8</td></tr><tr><td>52</td><td>5</td><td>6</td><td>8</td></tr><tr><td>53</td><td>5</td><td>6</td><td>8</td></tr><tr><td>54</td><td>5</td><td>6</td><td>8</td></tr><tr><td>55</td><td>5</td><td>6</td><td>8</td></tr><tr><td>56</td><td>5</td><td>6</td><td>8</td></tr><tr><td>57</td><td>5</td><td>6</td><td>8</td></tr><tr><td>58</td><td>5</td><td>6</td><td>8</td></tr><tr><td>59</td><td>5</td><td>6</td><td>8</td></tr><tr><td>60</td><td>5</td><td>6</td><td>8</td></tr><tr><td>61</td><td>5</td><td>6</td><td>8</td></tr><tr><td>62</td><td>5</td><td>6</td><td>8</td></tr><tr><td>63</td><td>5</td><td>6</td><td>8</td></tr><tr><td>64</td><td>5</td><td>6</td><td>8</td></tr><tr><td>65</td><td>5</td><td>6</td><td>8</td></tr><tr><td>66</td><td>5</td><td>6</td><td>8</td></tr><tr><td>67</td><td>5</td><td>6</td><td>8</td></tr><tr><td>68</td><td>5</td><td>6</td><td>8</td></tr><tr><td>69</td><td>5</td><td>6</td><td>8</td></tr><tr><td>70</td><td>5</td><td>6</td><td>8</td></tr><tr><td>71</td><td>5</td><td>6</td><td>8</td></tr><tr><td>72</td><td>5</td><td>6</td><td>8</td></tr><tr><td>73</td><td>5</td><td>6</td><td>8</td></tr><tr><td>74</td><td>5</td><td>6</td><td>8</td></tr><tr><td>75</td><td>5</td><td>6</td><td>8</td></tr><tr><td>76</td><td>5</td><td>6</td><td>8</td></tr><tr><td>77</td><td>5</td><td>6</td><td>8</td></tr><tr><td>78</td><td>5</td><td>6</td><td>8</td></tr><tr><td>79</td><td>5</td><td>6</td><td>8</td></tr><tr><td>80</td><td>5</td><td>6</td><td>8</td></tr><tr><td>81</td><td>5</td><td>6</td><td>8</td></tr><tr><td>82</td><td>5</td><td>6</td><td>8</td></tr><tr><td>83</td><td>5</td><td>6</td><td>8</td></tr><tr><td>84</td><td>5</td><td>6</td><td>8</td></tr><tr><td>85</td><td>5</td><td>6</td><td>8</td></tr><tr><td>86</td><td>5</td><td>6</td><td>8</td></tr><tr><td>87</td><td>5</td><td>6</td><td>8</td></tr><tr><td>88</td><td>5</td><td>6</td><td>8</td></tr><tr><td>89</td><td>5</td><td>6</td><td>8</td></tr><tr><td>90</td><td>5</td><td>6</td><td>8</td></tr><tr><td>91</td><td>5</td><td>6</td><td>8</td></tr><tr><td>92</td><td>5</td><td>6</td><td>8</td></tr><tr><td>93</td><td>5</td><td>6</td><td>8</td></tr><tr><td>94</td><td>5</td><td>6</td><td>8</td></tr><tr><td>95</td><td>5</td><td>6</td><td>8</td></tr><tr><td>96</td><td>5</td><td>6</td><td>8</td></tr><tr><td>97</td><td>5</td><td>6</td><td>8</td></tr><tr><td>98</td><td>5</td><td>6</td><td>8</td></tr><tr><td>99</td><td>5</td><td>6</td><td>8</td></tr><tr><td>100</td><td>5</td><td>6</td><td>8</td></tr></tbody></table> 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	⚡ Keyway(s) and set screw flats are added in the same plane. When the distance of the alterations are over 500mm, ±2 degree phase differential may occur.																																																																																																																																																																																																																																																																																																																																																																																																																							