GEAR STEPS 1-14

Shifting mechanism

This illustration shows the hub axle with its assembled clutch elements: Clutch ring (1), (2) and (3) together with sun gears 1(1) and 1(2). The middle sun gears 2(1) and 2(2) are not featured to reveal the state of the pawls.

The axle contains the shifting shaft, index mechanism, pawls 1(1), 2(1), 2(2) and 1(3) and the cam tracks for clutch rings 1 and 2. The corresponding sun gears are coupled to the axle by these pawls. The clutch rings shift the planetary gear assemblies (1), (2) or (3) respectively into direct drive (1:1).

Gears #1-7 are shifted with the first revolution of the shifting shaft. Clutch ring 3 shifts gear assembly #3 into its direct-drive gear during the shift from gear #7-8. Gears #8-14 are then shifted with the second revolution of the shifting shaft.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/08_schaltfunktion/schaltfunktion.m4v

Gear 1

Gear Assy 1
Ring gear (1) is driven by the sprocket. The pawl 1(1) couples the sun gear 1(1) to the axle. The stepped planet gears (1) are driven by the ring gear (1). In doing so, the stepped planet gear's first gear step rolls off the fixed sun 1(1). The result is 0.682 rotations of planet carrier (1-2) for each sprocket rotation.

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) directly to the sun gear (3)

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 0.682 (gear assy 1) x 1 (gear assy 2) x 0.409 (gear assy 3) = 0.279 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang01.m4v

Gear 2

Gear Assy 1
Ring gear (1) is driven by the sprocket. The pawl 2(1) couples the sun gear 2(1) to the axle. The stepped planet gears (1) are driven by the ring gear (1). In doing so, the stepped planet gear's second gear step rolls off the fixed sun 2(1). The result is 0.774 rotations of planet carrier (1-2) for each sprocket rotation.

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) directly to the sun gear (3)

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 0.774 (gear assy 1) x 1 (gear assy 2) x 0.409 (gear assy 3) = 0.316 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang02.m4v

Gear 3

Gear Assy 1
Gear assy one (1) is shifted like 1st gear. One sprocket rotation results in 0.682 planet carrier rotations (1-2).

Gear Assy 2
Gear assy two (2) is shifted like 6th gear. One planet carrier (1-2) rotation results in 1.292 joint ring gear (2) and sun gear (3) rotations .

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 0.682 (gear assy 1) x 1.292 (gear assy 2) x 0.409 (gear assy 3) = 0.360 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang03.m4v

Gear 4

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) directly to the sun gear (3).

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 1 (gear assy 1) x 1 (gear assy 2) x 0.409 (gear assy 3) = 0.409 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang04.m4v

Gear 5

Gear Assy 1
Gear assy one (1) is shifted like 2nd gear. One sprocket rotation results in 0.774 planet carrier rotations (1-2).

Gear Assy 2
Gear assy two (2) is shifted like 7th gear. One planet carrier (1-2) rotation results in 1.467 joint ring gear (2) and sun gear (3) rotations.

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 0.774 (gear assy 1) x 1.467 (gear assy 2) x 0.409 (gear assy 3) = 0.464 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang05.m4v

Gear 6

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
Pawl 2(2) couples sun gear 2(2) directly to the axle. The planet carrier (1-2) drives the stepped planet gears (2). With the second gear step the stepped planet gears (2) roll off the fixed sun gear 2(2). Thus one planet carrier (1-2) rotation results in 1.292 rotations of the joint ring gear (2) and sun gear (3).

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off, within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 1 (gear assy 1) x 1.292 (gear assy 2) x 0.409 (gear assy 3) = 0.528 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang06.m4v

Gear 7

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
Pawl 1(2) couples sun gear 1(2) directly to the axle. The planet carrier (1-2) drives the stepped planet gears (2). With the second gear step the stepped planet gears (2) roll off the fixed sun gear 1(2). Thus one planet carrier (1-2) rotation results in 1.467 rotations of the joint ring gear (2) and sun gear (3).

Gear Assy 3
Ring gear (3) is coupled to the axle. The stepped planet gears (3) are driven by sun gear (3). These roll off, within the fixed ring gear (3). Therefore, the rotation of the planet carrier (3) is reduced by the factor 0.409.

One sprocket rotation results in:- 1 (gear assy 1) x 1.467 (gear assy 2) x 0.409 (gear assy 3) = 0.600 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang07.m4v

Gear 8

Gear Assy 1
Ring gear (1) is driven by the sprocket. The pawl 1(1) couples the sun gear 1(1) to the axle. The stepped planet gears (1) are driven by the ring gear (1). In doing so, the stepped planet gear's first gear step rolls off the fixed sun 1(1). The result is 0.682 rotations of planet carrier (1-2) for each sprocket rotation.

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) direct to the sun gear (3)

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 0.682 (gear assy 1) x 1 (gear assy 2) x 1 (gear assy 3) = 0.682 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang08.m4v

Gear 9

Gear Assy 1
Ring gear (1) is driven by the sprocket. The pawl 2(1) couples the sun gear 2(1) to the axle. The stepped planet gears (1) are driven by the ring gear (1). In doing so, the stepped planet gear's second gear step rolls off the fixed sun 2(1). The result is 0.774 rotations of planet carrier (1-2) for each sprocket rotation.

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) direct to the sun gear (3)

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 0.774 (gear assy 1) x 1 (gear assy 2) x 1 (gear assy 3) = 0.774 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang09.m4v

Gear 10

Gear Assy 1
Gear assy one (1) is shifted like 1st gear. One sprocket rotation results in 0.682 planet carrier rotations (1-2).

Gear Assy 2
Gear assy two (2) is shifted like 6th gear. One planet carrier (1-2) rotation results in 1.292 joint ring gear (2) and sun gear (3) rotations .

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 0.682 (gear assy 1) x 1.292 (gear assy 2) x 1 (gear assy 3) = 0.881 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang10.m4v

Gear 11

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
(not featured to provide a better overview) Gear assy two (2) is shifted 1:1 and transfers the rotation from gear assy (1) direct to the sun gear (3).

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 1 (Gear Assy 1) x 1 (Gear Assy 2) x 1 (Gear Assy 3) = 1.000 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang_11.m4v

Gear 12

Gear Assy 1
Gear assy one (1) is shifted like 2nd gear. One sprocket rotation results in 0.774 planet carrier rotations (1-2).

Gear Assy 2
Gear assy two (2) is shifted like 7th gear. One planet carrier (1-2) rotation results in 1.467 joint ring gear (2) and sun gear (3) rotations.

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 0.774 (Gear Assy 1) x 1.467 (Gear Assy 2) x 1 (Gear Assy 3) = 1.135 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang_12.m4v

Gear 13

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
Pawl 2(2) couples sun gear 2(2) directly to the axle. The planet carrier (1-2) drives the stepped planet gears (2). With the second gear step the stepped planet gears (2) roll off the fixed sun gear 2(2). Thus one planet carrier (1-2) rotation results in 1.292 rotations of the joint ring gear (2) and sun gear (3).

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 1 (Gear Assy 1) x 1.292 (Gear Assy 2) x 1 (Gear Assy 3) = 1.292 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang_13.m4v

Gear 14

Gear Assy 1
(not featured to provide a better overview) Gear assy one (1) is shifted 1:1 and transfers the sprocket rotation direct to the planet carrier (1-2).

Gear Assy 2
Pawl 1(2) couples sun gear 1(2) directly to the axle. The planet carrier (1-2) drives the stepped planet gears (2). With the second gear step the stepped planet gears (2) roll off the fixed sun gear 1(2). Thus one planet carrier (1-2) rotation results in 1.467 rotations of the joint ring gear (2) and sun gear (3).

Gear Assy 3
Ring gear (3) and sun gear (3) are coupled together, thus the stepped planet gears (3) cannot rotate. Gear assy (3) is therewith shifted 1:1 and transfers the rotation from gear assy (2) directly to the planet carrier (3).

One sprocket rotation results in:- 1 (Gear Assy 1) x 1.467 (Gear Assy 2) x 1 (Gear Assy 3) = 1.467 hub rotations.

Video available on:
https://www.rohloff.de/fileadmin/rohloffde/technik/speedhub_tour/01_technik/07_getriebestufen_1-14/gang14.m4v